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The importance of good educational software is discussed

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NEXT MONTH

The January, 1983, issue of **the Rainbow** will focus on Adventure games. The winner of our Adventure Content, and that winner's program, will be featured.

ALSO: A program to make banners on any printer, another game, our regular features, product reviews, and much more! Don't miss the January, 1983, issue of **the Rainbow**, the premier magazine for the Color Computer, TDP-100 and Dragon-32!

The Rainbow

Lawrence C. Falk Editor

Courtney Noe Associate Editor

Anne Yeiser Production Coordinator

Bob Albrecht
Steve Blyn
Don Inman
Joseph Kolar
Dennis Lewandowski
Bill Nolan
Charles Roslund
Contributing Editors

Patricia H. Hirsch General Manager

Ivanka Kleier Customer Service Manager

> Monica Wheat Research Assistant

> > Wendy Falk Transportation

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letters to ___

RAINBOW

WE REGARDED IT

Editor:

You may well elect to disregard the Reader Survey form that I have enclosed because it is a photocopy. That, certainly, is your option. However, before you take that decision, permit me to explain. You brought it on yourself!!

In my humble opinion, the Rainbow ranks number one against all the competition in uniqueness, helpfulness, practicality, range and scope of topics and (to a lesser extent) advertising—with the painful exception of some excruciating

Because I value the Rainbow so highly, I am loath to eviscerate any issue and risk losing other pages thereby, let alone the advertiser's index printed on the reverse of the form. Therefore I hereby certify, warrant, and guarantee that this photocopied Survey Form is the sole and only copy you will receive from my subscription. I beg you to accept it.

Keep up the good work!

Townsend P. Coleman Jr. West Palm Beach, FL

Editor's Note: Accepted. And thank you for your kind words. There's nothingh worse than an eviscerated Rainbow.

WRONG AGAIN

Editor:

My program in the October issue is called ULAMMALU, not UAMMALU as printed.

For more about cellular automata, see Martin Gardner, Scientific American, February, 1971.

> Chris Reid New York City

Editor's Note: Napoleon is reputed to have once made the palindromic comment "Able was I, ere I saw Elba." If we would have been able to notice the palindrome Mr. Reid used as a title we would have seen our mistake. Sorry, Chris.

MOTORING ALONG

Editor:

Below you will find a method to have voice in programs. I find it very useful/interesting. It is a rather crude method, but compared to paying \$50 to \$100, it is good.

The AUDIO ON and MOTOR ON commands are all that are really used in this

method. I will give a layout of the required statements:

??? A=(A number of seconds): GOSUB 6000

6000 AUDIO ON: MOTOR ON: FOR I=1 TO 410*A: NEXT I

6010 MOTOR OFF: RETURN

That is all you need. Add Line ??? whereever you want some voice in your Basic program. What you must do for the voice is this:

- 1. Record what you want said and time yourself. The amount of time becomes variable A. Make sure you record what you want said about half a second after the program ends or so. This way, when the program ends, you won't have to switch cassettes. It will follow the program.
- 2. Turn the volume all the way up. This is necessary so the voice can be heard.
- 3. Run the program. As long as it has the voice play system in it.

This method has added a whole new field of programming for me. Voiced instructions, demonstrations and so forth. I hope it gives you as many ideas as it gave me.

> Doug Toombs Rochester, NY

CLUBS

Editor:

Recently I came across your fantastic magazine and was amazed at hoe much you have grown. I was very much overwhelmed with this much support! And, it took me over three hours just to complete your magazine.

Are there any user's groups in the Orlando area? I would like to hear from other 80C owners. Write me at 3085 N. Goldenrod Rd., Orlando, FL 32807.

Jae Nam Noh Orlando, FL

Editor:

Is there a CoCo user group in the Portland area? If anybody has some information or wants to form one, please contact me at P.O. Box 5907, Mortland, OR 97228.

Greg Sexton Portland, OR

PMODE4 COLORS

Editor:

I think your magazine is the best thing that ever happened to the Color Computer. Here is a short program that will produce many colors in PMODE4: 10 PMODE4,1: =1: FOR C=1 TO 8

20 CLS: SCREEN 1,1

30 FOR I=1536 TO 7678 STEP 2

40 J=J+0.01: POKE 1,J

50 POKE 1+1,J: NEXT 1: NEXT C

50 GOTO 60

Anyone interested in a Color Computer Club in the Jacksonville area contact me at 2411 Hirsch Ave., Jacksonville, FL 32216 or call at (904) 721-0282.

> Bill Brown Jacksonville, FL

JOYSTICKS & TAPES

Editor:

I felt that it was time to contribute some information to my fellow readers from whom I have received a lot of valuable hints and suggestions in the past.

A short time ago I encountered some difficulty with the Radio Shack joystick. The problems did not occur all the time, but made the joysticks quite unreliable, Suspecting that the pots were at fault, I dismantled the controller and used an OHM meter for tests. My testing revealed that the problem was not the pots, but the cable itself. This appears to be caused by the sharp bend the cables are required to make while entering the case. The solution, of course, is to either shorten the cable or, as in my case, purchase new five-wire braded cable and resolder the connections. This turned out to be an easy task because the wires are color coded and the pots are not especially critical to heat, as are IC chips.

The second problem for which I have found a cure is regarding cassette-based programs which I have ordered and found that they refuse to load in. I simply connect my computer recorder to a good quality cassette recorder and copy one cassette to another in the midrange volume. In the two instances which I tried this, I was able to load the new cassette with no problem.

With tapes which are recorded at too low a volume, you can pick up the sounds by turning up the volume of the computer recorder, but then the distortion of the sound tends to cause I/O errors.

Gerald Casey Prince Rupert, B.C.

BASIC BASIC

Editor:

I really do like your magazine. The only thing I wish you would change is this: Please print more programs for the CoCo (my favorite nickname) that require regular Basic, not Extended Color Basic and 4-16K.
Thanks.

Mal Lynn Shreveport, LA

PROTECTED SOFTWARE

Editor:

As a responsible, consumer-oriented publishing company, you and your fellow magazine publishers can solve the problem of "protected software" by refusing to accept ads from companies with protected software, unless you receive with such an ad an unlock routine and permission to publish same in the event of the demise of the company or its inability to furnish service to owners of said software.

Spencer Trimble Tallahassee, FL

Editor's Note: We take the position that firms have a right to purchase advertising space from us if they are responsible and act in good faith. We do police our advertisers and one section of this column is usually reserved for reader comment on vendors. Firms which protect software against piracy could furnish us with the "key" to the lock if they so desired, and we would be pleased to hold them for possible publication in the event of the firm's "demise." Howewer, the issue of a firm's "inability to furnish service" is an interesting legal point that, I am sure, the many attorneys among our readership would love to argue about.

SIMULATIONS

Editor:

The Rainbow is looking more professional all the time—you have reason to be proud of the overall quality you have attained in this type of publication. You have hit the right compromise between beginner and experienced hobbiest. You let the reader know in understandable terms just what is happening in the world of the Color Computer.

Requests: If anyone happens to submit a realistic simulation, please publish it. I'm absolutely starving for good, high quality educational simulations such as operating a nuclear power plant, running a country (Viking is a step in the right direction), or fighting an insect infestation.

Please give more information in your reviews. Usually there is not enough to determine whether I would be happy with a

I hope the Rainbow will continue to aim more at the mainstream Color Computer owner.

Complaint: Your emphasis of Dungeons and Dragons-type software is a bummer. It would seem that one article per month would be adequate for this type subscriber.

Bob Pakes Forestville, CA

BEING SURE

Editor:

Whenever I save a program to tape, I always make three copies of it. That way, if the first copy fails to load or if the tape

breaks, I don't lose my program. At the end of all by Basic programs I add lines 6990-7030 (below) to make it easy to make three copies without having to type CSAVE three times.

6990 END 7000 FOR A=1 TO 3 7010 CSAVE "FILENAME" 7020 FOR B=1 TO 1000: NEXT B 7030 NEXT A

Remove the motor control from the tape recorder, type RUN 7000, put the recorder in record and press ENTER. The program will be saved three times. Line 6990 keeps these lines from being run until you want them to be. Line 7020 will insert a space between the program saves so it will be easier to tell where one copy ends and the next one begins.

Dennis Duke Bessemer, AL

Editor's Note: For those of you impatient to know where you are, you can always add:

7005 PRINT "ON SAVE NUMBER" A

WAY TO LEARN

Editor:

I would like to see more materials on how to use the CoCo. Something to make me a better programmer—to teach me how to better write my own programs, such that I can write my own utilities, machine language, games, home use programs, etc.

All the programs I can buy or key in from your magazine are nice, but I get the most fun bashing about while writing my own creations. The old saying "You get more enjoyment from the getting there than the arriving..." holds for me.

So, the more I can learn from the Rainbow about the innards of the CoCo's routines, etc., or better use of the Basic language, the more good you will do me.

Also, please, keep business programs out of the Rainbow, please.

Bill Frankart Spokane, WA

Editor's Note: Bring out the old soapbox again. The best way to learn programming is by keying in programs and doing so from a learning perspective. Certainly, we know you don't have time to key in everything—that's why we supply a Rainbow On Tape for those who want it

But, for those of you who want to learn a specific point, take a program from any issue that addresses that particular area of interest and key it in. No, don't just key it in, study it as you do so. That's what I did early in my experience with CoCo—and, I wish I had a dime for all the times I said to myself "Oh, that's how he did that!"

Another thing: If you are using a book to learn, be it the "official" manuals or the excellent books from the likes of Bob Albrecht and Don Inman, don't do a hop, skip and jump through them. Start at the beginning and make way to the end. There's a lot in all of them, even if the subject seems out of your area of interest.

As to business programs, we get an awful lot of requests for them and plan to continue to provide them. But, there will always be other programs, too.

And now, as a friend is wont to say, we plan to fold up our tent, put the soapbox away, and steal off for at least another month.

ROM PACK MODIFICATION

Editor

I recently purchased a copy of the Disk Color Scripsit. One of the advantages of this program over the earlier ROM Pack version is the ability to change the printer Baud rate.

Since I have an Epson MX-80, I was delighted to find that selecting a Baud rate of 2400 worked very well and speeded things up immensely.

My only concern was whether the other programs which I have which utilize the printer could easily be modified for the new Baud rate. Of course, all Basic programs could be modified by including a line containing POKE 150,18 before any printing takes place.

The only other problem was two ROM Packs, Spectaculator and Edtasm+. To my relief, I discovered both of these programs can be easily fixed. Turn the computer on, without the ROM Pack in, and type POKE 65315,54: POKE 150,18. The first POKE disables the cartridge auto-start. The second sets the Baud rate (as described in "Going Ahead With Extended Color Basic", pages 209-210). Now, insert the cartridge and type in EXEC &HC000. This starts the program but leaves your selected Baud rate intact. Unfortunately, this does not work with the Color Scripsit ROM Pack.

Lester Hands Sylvania, OH

Editor's Note: Before you insert a ROM Pack into a powered-up CoCo, we suggest you read the letter immediately following.

WARNING LETTER

Editor:

I urge you to print this letter or in some other way warn your readership of the dangers associated with using non-Radio Shack design ROM packs. Although no ROM Pack should ever be plugged in or removed from the computer's port while the computer is on, and although one is so warned in the instructions, many owners and dealers commonly ignore this warning.

If the ROM Pack in question is a Radio Shack one, the dangers are less. But others are less precisely built and much more likely to wobble on insertion and removal. Both I and a fellow 64K fellow computer owner have burned out well over \$70 worth of chips each by accidentally plugging in a non-Radio Shack ROM Pack when the machine

was on.

Please urge your readers to be careful.

Martin H. Goodman, M.D.

Berkeley, CA

Editor's Note: Yes, you can easily fry a set of chips. Every ROM Pack manufacturer we know of, including Radio Shack, warns against unplugging the ROM Pack when CoCo is turned on. This is the reason.

VIDEOTEX ROMPAK

Editor:

I would like to pass along some details about Radio Shack's Videotex Rom Pack for the Color Computer.

I found out after a few days of experimentation and investigation that the current (1.1) version of this software cannot recognize the 32K computer model. It seems upon checking for memory size and finding it is not 16K, Videotex defaults to 4K of storage of a session's text.

Also, is seems necessary to unplug the modem cable from the serial I/O port to activate offline scrolling. An enhanced version (1.2) is expected to correct these problems so I would advise prospective buyers to check the product before purchasing.

Eric Bennett Port Hope, Ont.

EDUCATION ISSUE

Editor:

I have enjoyed watching your magazine grow and change. Top notch all the way!

The education issue is much appreciated. Except for the negative feedback Mr. Wells gives the student in his Math Drill, it is a useful program (perhaps someone could let us know how to right justify the numerals so they line up in the proper column). I am sure Mr. Wells included this type of reinforcement light-heartedly, however, as a teacher, I cannot justify telling a student he "must have Jello for brains." I do not want this to be taken as negative criticism, for such lines are easily changed.

Perhaps this type of constructive criticism is needed, if only to remind adults that we must be especially careful to make computers in education user-friendly. Indeed, I applaud Mr. Wells for his instructive program. It is well explained and has taught me some useful routines (like avoiding a remainder in division).

Another recommendation for educational software would be to disengage the BREAK and CLEAR keys. A fellow member of the Sudbury & District Color Computer Club pointed out a routine on page 268 of Radio Shack's "Getting Started With Color Basic" that will disengage the BREAK key. Now, what about CLEAR?

Finally, my experience with using computers in primary classrooms has invariably proven Murphy's Law to be correct. Therefore, I must join those who await the day when subroutines to disengage all unnecessary keys are routinely included in all educational programs. The lower the grade level, the more they are needed.

Jim Pratt Espanola, Ont. Editor's Notes. . .

PRINT #-2,

I was seriously thinking about enjoying the opportunity to write this end-ofthe-year Holiday column. I was going to use it to reflect back on a year's happenings for the Color Computer and the Rainbow. CoCo has come a long way, baby. And it will be going even further, I am sure, in the next 12 months.

What I was going to do was to first look at CoCo and then the magazine. Then, I planned to offer a Holiday wish list of things I really hope to see in the next year. I'll still do that but, I fear, some of the enthusiasm for all that is spoiled by a column I just finished reading in another computer publication.

Almost a year ago, we CoCo owners were "treated" to what was alleged to be some "inside information" that our favorite computer was soon to be scrapped by Radio Shack. I refer, of course, to Wayne Green's column in the February issue of 80 Micro. Well, I guess Wayne and 80 Micro have decided that CoCo is going to be around, because we are seeing more about the 80C in 80 Micro again this month (December). What is being said now is that Mr. Green fears that Tandy is allowing the CoCo to die on the vine because of lack of support from Fort Worth.

In what is one of the longest-running feuds in the computer industry, Mr.



Green again lambasts Radio Shack for what he considers poor merchandising, lack of support and the like. Sure, we agree that Tandy is not perfect. Neither, however, is the Apple Computer Co., Inc., International Business Machines, Commodore, etcetera, etcetera.

Mr. Green wants more "cooperation" between Tandy and outside suppliers of software, hardware and firmware. In his case, cooperation means selling 80 Micro in Radio Shack's stores. O.K., we'd love to have the Rainbow sold in Radio Shack stores, too. But we're not in the position of blasting anything and everything Tandy does simply because they have yet to fly to Louisville and beg us to supply 30,000 copies of our magazine to them every month.

Mr. Green asks "What would be the result if (the CoCo were) supported by the enormous accessory and peripherials industry that has sprung up around the TRS-80 system?" Well, Mr. Green, the result might be that Tandy would be selling thousands of Color Computers, that there would be a large—and growing larger daily—support industry already in place and that there would be a lot of happy people out there—both users and Tandy-ites.

The truth of the matter is that Tandy is selling thousands of Color Computers every day. The truth of the matter is that there is a very large support industry built around CoCo. The truth is that it seems there is more (let's call it) affection lavished on CoCo by its users than on any personal computer we have seen.

Perhaps Mr. Green is judging reaction to CoCo by reading his own pages too much. After all, the same issue of 80 Micro which carries his column this month also gives some advice in its "Feedback Loop" section to a CoCo owner that the magazine for Color Computer owners is 80 Micro, the same magazine that predicted the demise of the 80C just a few short months ago.

What does "Feedback Loop" say? It tells this reader "Your best source of information on the Color Computer is 80 Micro (this isn't just a plug for this magazine, it's the truth). 80 Micro has more companies advertising products for the Color Computer than either of the two publications specializing in the Color Computer."

Hogwash and balderdash! We counted 39 firms advertising Color Computer products in 80 Micro. Another publication primarily aimed at CoCo had a handful more than they did. And the Rainbow had 107 total firms advertising in November (and there are another 15 or so this month). We won't even go into a





Converting music to play on the 80C is not difficult. In fact, I find it a lot of fun. In this article I will try to explain some basic music symbols and terms. With this knowledge we will try converting a song to play on the Coco ourselves. Pay close attention, because there may be a test later. There are just a few musical symbols that you must learn to interpret. You don't need to be a musician or even have a great knowledge of music, and one thing nice about teaching your computer to play is that you don't have to worry about how fast your're going. There are no other instruments to keep up with and you can take as long as you like when typing in a song—an hour or two weeks. I find it convenient that the 80C uses the same names for the notes as are used in music. Once you learn the names of the notes in music, it's easy to remember the code used in the PLAY statement on the Coco.

First things first, you must have some sheet music of the song you wish to convert. Rather than have everyone run right out and purchase music, I've included two songs in this article. Normally you will want to purchase music written on the treble cleff.



This symbol at the beginning of the staff lets you know the music was written for the treble cleff. You will only be putting the melody line into the PLAY statement. Coco cannot produce harmonics (two notes played at the same time) in BASIC. I find music written for a C instrument, such as a flute or saxaphone, easy to use. If you check with someone at a music store, you will find them willing to help and usually intrigued by the ideas of teaching a computer to play.

Now we need to figure out what all those notes are. The following illustration lets you see where each note is on the staff and its letter name.

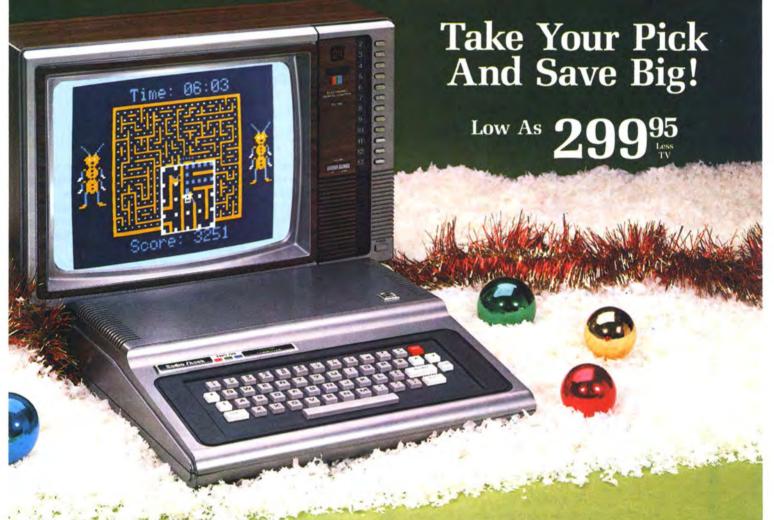


The staff consists of five lines and four spaces. If you remember that the notes on the spaces, starting at the bottom, spell out F-A-C-E. You will find it easy to extrapolate the other notes. The notes on the lines, starting at the bottom, are E-G-B-D-F. The staff is divided into measures by a bar, a vertical line across the staff. Each measure will take the same length of time to play. We will cover this shortly. The notes continue above and below the staff. Immediately below the bottom staff line is a D note and the next note down with a line drawn through it is middle C. Centuries ago the bass and treble cleffs were combined with no deliniation between them. Having a staff of eleven lines made it difficult sometimes for musicians to remember where they were. This difficulty was solved by eliminating the middle line between the bass and treble cleffs and indicating it with a short line drawn through middle C. This made it much easier to see when you were crossing into the treble cleff and vise versa.

Music must count the same in each measure. This is indicated at the beginning of the staff with a time signature. Two numbers will be printed. The top one shows the number of beats per measure, while the lower one tells what kind of note takes one beat. This means that if at the beginning of the staff we see "3/4", then quarter notes get one beat and there are three beats to a measure. There would then have to be a total of three quarter-notes per measure. These could all be quarter notes or combinations of half, quarter, eighth, sixteenth notes etc. All this is not critical for converting music to the 80C. Just a bit of esoteric knowledge.

Since notes start at C (the lowest note in an octave) and go to B (the highest) and then repeat several times, there must be a way to tell the difference between a high C and a low C. This is where octave changes come in. The first octave is found on the bass cleff and the notes are very low. The next octave bridges the bass and treble cleffs and the notes have a higher sound. Each octave changes at the same note name. Logically you would think it should be when you go from G to A, but who ever said humans were logical. Music changes octaves when going from B to C. The note B will end one octave and C will start the next. The bass cleff is octave 1 on Coco, and at middle C it becomes octave 2. In the middle of the treble cleff, at the third space, it becomes octave 3. To do

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an octave change on the computer you type capital O and the number of the new octave. It is very important that you make sure that you use the capital letter O, not a zero, otherwise you will get an error.

Some notes can be sharp or flat. If a note is going to be flat throughout the song there will be a symbol like this at the

beginning of the staff.



This indicates that the note on that line or space will be flat throughout the song. There will only be one indicator, even though it means all notes of that name are sharp or flat in all the octaves. To type a flat note into the computer you need to put a minus sign (-) after the note. For example: PLAY "AE-CDE-".

In the note is sharp this symbol will be found at the beginning of the staff.



All notes of this name in all octaves will then be sharp and to type a sharp note into the computer it will be necessary to put a pound symbol (#) sign after the note. For example: PLAY "AD#FGD#".

Sometimes a note will only need to be sharp or flat for a short time, so instead of putting the symbol at the beginning

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of the staff, it will be just in front of the note it is changing.



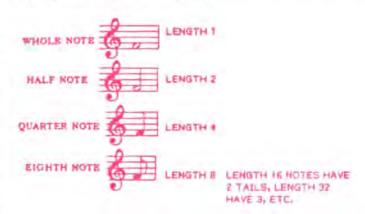
This means that all notes on that line or space are changed to sharps (or flats) for this measure only. At the end of the measure (when you come to a vertical line), the note will revert to its original state. Only the note it is in front of is affected. Notes of the same name in different octaves will not change. This type of thing is also used to change a note that is sharp or flat to a natural (not sharp or flat).



Again, this means that the note with the natural sign in front of it is changed. It is natural for this measure only and reverts at the end of the measure to a sharp or flat.

The Coco's PLAY statement doesn't use B sharp or C flat. Too Bad. If you fnd these in the music you are converting, you must make a B sharp into a C (an octave higher) and a C sharp into a B (an octave lower).

Notes are held for different lengths of times. In music the note symbols mean the following:



They are typed into the computer using L and a length number. The length of the note is typed into the computer before the name of the note. If you had a half note A and a quarter note D it would look like this: PLAY"L2AL4D". Most often you can use the same lengths on Coco that are used in music, but every once in a while it is necessary to use odd lengths. For example, if you find a series of three notes that are bracketed together with a three, you must play these three in the same time as you would play two. These are triplets and I have found it necessary to make these lengths an odd amount. L6 works for three quarter-notes. If you have three eighth-notes then use L13 (see Havah Nagilah in the program below).

If on the staff you see a note like this:



You just add a period after the length number like this: PLAY "L2. GL2DL4.D". A dotted note means that the length of the note is increased by one half. You can dot a note more than once and each time it will be increased by one half its original length. On the 80C once you have

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FULL FEATURED TEXT EDITING

A full array of commands help in the creation and modification of text. The text displayed on the screen may be moved up, down, left or right. The cursor can be moved to any page or to any specified series of letters or words. The cursor itself can be moved left, right, up, down, to any tab position, or to the extreme left or right. Any block of text can be moved, copied or deleted. The operator may also do a global replace so that all occurrences of a given string will be replaced with or without a "prompt" asking if the item should be replaced.

OPERATOR CONVENIENCE

Files longer than memory can be edited. The operator can move forward through a long text file by selectively dumping text to the disk or filling from the disk.

The supervisor mode is **menu driven** and self prompting so that the operator does not have to remember the syntax of commands. This makes it easier for new operators to use the system.

An "assist" or "help" function makes it easy to learn the system since it is normally not necessary to consult the manual to learn the commands. This function is menu driven and lists all of the keyboard functions and the formating commands.

At the beginning of the text the operator normally types in a few simple commands indicating the line length, left margin, and so forth, and then enters the header and footer as they should appear. After that the operator need not worry about formating since it is taken care of automatically. Words that extend beyond the end of the line are automatically removed and placed on the next line. Headers and footers are automatically inserted so that the operator always knows what portion of the page is being worked on. Ghost hyphens can be entered so that if the word falls at the end of a line, and a ghost hyphen has been inserted, the hyphen will automatically be added.

FLEXIBLE DISPLAY

Lines longer than the screen width are allowed. STYLOGRAPH can scroll right and left on the screen so that tables can be constructed and appear on the screen exactly as they will appear on the print out.

A command allows viewing of the formating commands on the screen, Another

A command allows viewing of the formating commands on the screen. Another command allows the operator to see which characters will be modified at print out by underlining, superscripting or boldface. A page status command shows the current format values and other useful information.

COMPLETE FORMATING CONTROL

The text of individual lines may be centered, left justified, right justified, or right and left justified. Tabs can be set or cleared at any point. Spacing of the lines on the page is under complete operator control with end of page, spacing and vertical tab commands.

While entering text, it may be specified that the characters have some kind of modification when they are printed, such as underlining, superscript, boldface, overline, or subscript. These character modifications are done with "control" key strokes. For example, to start underlining characters, simply hold down the "CTRL" key, hit the "U" key and continue entering text. To stop underlining, hit the "DEL" or "RUB" key.

POWERFUL PRINTING OPTIONS

Underlining is supported on TTY type printers. For those people who have specialty printers there are a variety of additional capabilities including: 1.5 line spacing

1.5 line spacing BOLDFACE superscript' subscript; underline, overline, or any combination

Right and left justification of text is accomplished by incremental printing on TTY type printers. True proportional spacing is supported on the specialty printers.

Control codes may be embedded in the text for special applications. For example, some printers require special control sequences for double width, graphics poldface. These sequences may be embedded in the text for those users that have these printers. In conjunction with this, it is possible to cause the printer to stop in the middle of a print out for changing printwheels. A backspace feature allows overstriking.

OPERATING SYSTEM COMPATIBILITY

STYLOGRAPH is compatible with the FLEX, UniFlex, and OS-9 disk operating systems. Text files prepared using STYLOGRAPH are directly usable by other software such as BASIC and the assembler. (This significantly aids software development since cursor-based editing allows full viewing of the text being worked on, thereby reducing errors and decreasing programming time). File size is limited only by the capacity of the disk system. Files may be loaded into the text at any point making it possible to rapidly create "boiler plate" documents using portions of text that have been previously saved to a text file. Any portion of a text may be saved to a text file for use at a later point. The printer output may be directed to a disk file for later print spooling. Most operating system commands are directly accessible without leaving STYLOGRAPH.

FULLY ADAPTABLE TO MOST PRINTERS

STYLOGRAPH is easily configured by the user for most terminals so there is no need to send for updates as equipment changes are made. Source code of the terminal interface is supplied so that users with unusual equipment configurations may adapt it to their systems. The source code for all of the "prompts" is also supplied so that foreign language versions may be easily constructed.

Printers currently included as standard are: Diablo, Qume, Starwriter, NEC

Printers currently included as standard are: Diablo, Qume, Starwriter, NEC 5515/25, NEC 5510/20; CENTRONICS 737/739; TTY type printer with backspace function; TTY type printer without backspace function.

COMPLETE INSTRUCTIONS

A special tutorial section is included in the manual so that people with little or no computer experience can easily learn to use STYLOGRAPH in a few hours. A text file is included which demonstrates most of the features of STYLOGRAPH and allows the operator to practice most of the functions. The logical arrangement of the commands and the immediate display of the results greatly simplifies the learning process. In addition there is an "assistance" command which helps the new operator learn the commands.

STYLOGRAPH MAIL MERGE

A major option of STYLOGRAPH is the related MAIL MERGE program. This program adds "form letter" capability to STYLOGRAPH. Variables such as names addresses, dates, may be taken from a disk file or the keyboard at print out time and inserted into the text. Successive letters may be printed out without operator intervention.

The second important capability of the MAIL MERGE program allows many STYLOGRAPH text files to be appended at print out time. This allows files to be edited in smaller, more convenient blocks and then appended at print out time so that the page numbers will remain consecutive and the headers and footers will automatically be retained through all of the print out.

STYLOGRAPH SPELLING CHECKER

Another major option of STYLOGRAPH is the related SPELLING CHECKER program. This program reads through a text file and compares the words in the file with a dictionary. Words that are not found in the dictionary may be marked in the text for later editing, corrected on the spot, skipped, or added to the dictionary. Words may be added to or deleted from the dictionary to create unique vocabularies for particular applications.

STYLOGRAPH for the Color Computer FLEX 195	00
STYLOGRAPH MAIL MERGE125	00
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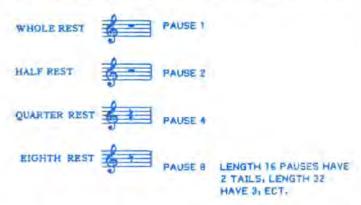
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established the length of a note it will be that length until you change it. If you had a series of quarter notes ADDFGE and then a half note you would type it like this: PLAY"L4ADDFGEL2A". All the notes before the L2 would be quarter notes. I should mention at this time that you can put semi-colons between the notes but this uses a lot of memory and is optional.

Every once in a while musicians like to take a short rest during their playing. After all, blowing horns is tiring. Actually some songs need the rest or pauses to sound right. To cover this need, music has a series of musical rests of different lengths. The symbols for these are as follows:



The computer thinks of these as pauses in play, and you use a P and a length number to indicate them in your PLAY statement. For example: PLAY"L4ADFP2L2A". Pauses do not change the length of the note. If you have a song like

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Semper Fideles with a series of notes of the same length and pauses of a different length, you don't need to keep typing in the note lengths after you type in the pause.

Now let's cover the speed of play, called tempo in music. I find this is one of the disadvantages of the Coco's PLAY statements. When they decided on the tempo range for Coco, the programmers who wrote the BASIC didn't leave enough leeway in the bottom end. When going from tempo 1 to tempo 2 your music will be twice as fast. The same from going from 2 to 4 and from 4 to 8. Maybe you only need to increase it half as much. It is particularly noticable at the slower tempos. We could really use a tempo 1.5! The only way I find to get a good tempo is to experiment until I find one that is closest to the speed I want. This means that songs written for the 80C will be close, but not always at exactly the right tempo. You put the tempo in the play statement, usually only once at the very beginning. For example PLAY "T202L4EDL2A#".

Well, we've covered a lot of ground and there are just a few more things we need to discuss before we can start converting our first song. If you see this symbol:



it means go back to the symbol that looks like this:



and play it over again. You might need to do this more than once, depending on the number of verses in the song. After repeating it as many times as necessary, you can then continue on to the end. Another possibility is a song that repeats only a portion of the song and has different endings. They will be numbered 1, 2 etc. The first time through you use ending one, and the next time you skip the first ending and insert the next one, and so on until you have done all of them. Then you continue on to the end.

We need to learn a little Latin here before we continue. Sometimes instructions will be written above the staff. Some of these are "D.C. (Da Capo) al" which means repeat from the beginning of the song to the word "Fine" or to these symbols:



Or, it might be "D.S. (Dal Segno) al" which means repeat from this sign



to the word "Fine" or to "Coda". If we see "To Coda," it means go from here to the section marked "Coda." If we have a song with "D.S. al Coda", and a symbol "To Coda and Coda." written above the staff, this means you go back at this time to the sign, repeat the song until you come "To Coda," and then skip down to a section of music that will be by itself beginning with "Coda," and then continue to the end of this section. This confuses me, too!

The last symbol we need to learn about is called a tie. It is a curved line from the head of one note to the head of another note. If the notes are the same then you combine the lengths

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together and play them as only one note. If the notes are different then you have to treat them as two seperate notes on the computer.

I have not been able to cover all the various symbols and words that are found in music; only the most common. This is a very cursury coverage of the subject. There are many fine books in the library or bookstores on the reading of music. I only hope you will find this helpful when you are converting songs to the 80C.

Now we need to put into practice what we have been learning. The following song is a popular Christmas carol, and we are going to translate it into code which Coco will understand. Each part is numbered to make it easier to follow the example.





Let's start typing a PLAY statement into the 80C. Put a line number in front of it so that you can save it when we are done. #1—our treble cleff symbol. #2—the notes that are to be flat throughout the song are indicated here. These are B and E. Remember, all B's and all E's are flat, even if they are in a different octave. #3—the first note is a quarter note on the first space, which means it is the note F in octave two. We start our statement PLAY"T2O2L4F". The tempo is just a guess now and can be changed later if necessary.

#4—we have the first half of a repeat sign, so we know we will be coming back here later. #5—the second note in the song is a half note D, and since we have gone past B on the staff it is in octave 3, which we must indicate in our PLAY statement. The next section in our statement is "O3L2D". #6—the next note has gone back below C, so it is back in octave 2, and the note length has gone back to a quarter note. We have then "O2L4A" to add to our statement.

#7 and #8 are two quarter-notes connected by a tie, but the notes are different. We treat them as two separate notes. The first one is C which is an octave change to 3. The next note B is an octave change back to 2. This note B is flat and we must indicate it in our statement with a minus sign. We add "O3CO2B—" to our statement. We do not need to indicate note length as they are both the same as the preceding ones.

#9 is a quarter note G. It is the same length as the previous notes, so we don't have to put in a length statement. #10 is a

length change to a half note F. #11 is back to a quarter note G. #12 is a length 2 F. #13 is a length 4 F. We can put the following into our statement: "GL2FL4GL2FL4G".

#14 is the first ending. #15 and 16 are tied notes. They are still length 4 but are a G and A, so they are treated as two separate notes. #17 is a length 4 B, so it is flat and a minus sign must be added to it. We add "GAB—"to our statement.

#18 and #19 are tied again in the same way but this time there is an octave change between them, so add B flat, 4 C to our statement like this: "B-O3C".

#20 is still in octave 3 and is a length 4 D. #21 and #22 are tied notes that are the same, so we treat them as one note. A dotted half note plus a half note comes out to be L2... C, because we must have five beats. (Remember, a quarter note gets one beat, so a half note gets 2, and a dotted half note gets three.) #23, an F, is an octave change back to 2 and a length change back to 4, so we put "DL2...CO2L4F" into our statement.

#24 is the second half of our repeat symbol, and tells us to return to our first repeat symbol at #4 and repeat the notes #5 through #13. When we reach #13 again we go to the second ending which starts at #25. Put the notes from #5 through #13 into your PLAY statement again.

#26 is the first note in the second ending and is a length 2 G. #27 changes to a length 4 G. #28 and #29 are tied quarter notes that are different—an A and a G. #30 is still a quarter note, F. We add "L2GL4GAGF" to our PLAY statement.

#31 and #32 are tied notes that are the same, so we treat

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them as one note only. We add a half note dotted B to a half note B to come out with a half note dotted three times. Put "L2...B—" into our statement.

#33—a D, has changed octaves to 3 and changed length to 4. #34 is still in octave 3 but is a length 2 D. #35 goes back to octave 2 and a length 4 D, so we put "O3L4DL2DO2L4D" into our statement.

#36 is still a quarter note, and is a D tied to #37, which is a quarter note E. Now, E is supposed to be flat in this song, but this note has a natural symbol in front of it, so we leave it alone. Do not add a minus sign to make it flat. #38 is an F. F has been natural so far, but there is a sharp symbol in front of this note. For this measure only, octave 2 Fs are sharp. We add "DEF#" to our statement.

#39—this G note has a length change to 2. #40 is length 4 A. #41 is a length 2 B flat. So we add "L2GL4AL2B—" to our song.

#42 is an octave change to 3 and length 4 D. #43 a length 4 C. #44 is an octave change to 2 and is a B flat. #45 is still a quarter note and is an A. Put "O3L4DCO2B-A" into our melody.

#46 and #47 are two different notes tied together. They are quarter notes G and A. #48 is a length 4 G. #49 and #50 are two notes tied which are the same. One is a length 2 dotted F, and the other is a length 2 F. Together they become a L2 F dotted three times. #51 is a length change to a 4 and note F. We add "GAGL2...FL4F" to our tune.

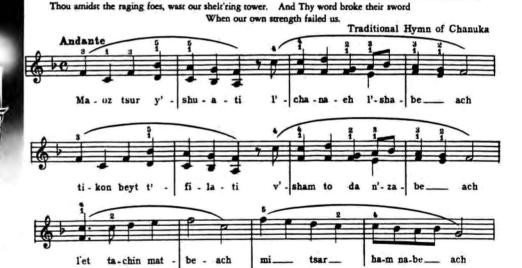
#52 "D.S. al Coda" means go back to the sign (#4) and repeat the notes through #13, (Put them in the PLAY statement.) where we find #53 which is "To Coda." We skip down to #54 (which is the "Coda") and which starts our next section. #55 is the first note in the coda, a half note G. #56 has a length change to 4. The note is still a G. #57 and #58 are two different notes tied together; an A and a G. We add "L2GL4GAG" to our carol.

#59 is a quarter note F. #60 and #61 are tied notes that are the same. We have a dotted half note (B flat) tied to a B flat half note. This is it, and if we add "FL2...B—" to our statement the song is finished. By the way, all the quotes except the one at the very beginning and the one at the very end are not used.

You can now type, RUN and listen to your computer play. The name of the song is "It Came Upon A Midnight Clear." I hope you were able to recognize it when the computer was playing. Edit the PLAY statement and change the tempo. Run it again. Do this a couple of times. See which speed it sounds best to you.

The following song is a popular Hanukkah hymn. This is your test. Now we'll see how well I explained thigs. Go ahead and try converting it yourself. Try not to cheat, but if you get stuck I have included it in the following listing. The only difficulty with this song is that in some places there are two notes together. The note the computer needs will be the top one. Ignore the other one and only use the one on top.





Well, this has been fun. I hope the pointers I have tried to give you will allow you to build a collection of songs for Coco. For your enjoyment during this holiday season, I have included a few melodies to start your collection.

Just type the program (VERRRY carefully) and run it. There are 17 tunes included. All you do is enter the number of the one you want, and listen to it PLAY. If you want the computer to play along unattended, make the following

changes:

eg'-mor b'

Delete line 20

shir miz-mor

Change line 10 to read: 10 FOR X=1 TO 17

Change line 30 to read: 30 CLS3:ON X GOTO

Change line 430 to read: 430 FOR Y=1 TO 400:NEXT Y,X

ha - miz

If you want them to repeat over and over, add a line, 440 GOTO 10.

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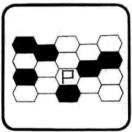
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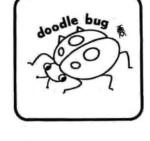
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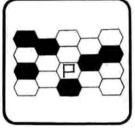
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10 CLS3:PRINT@100,"THE SONGBOOK"
;:PRINT@163,"INPUT YOUR CHOICE O
F SONGS";:PRINT@227,"";:INPUT X
20 IF X<0 OR X>16 THEN 10 ELSE C
LS3

3Ø ON X GOTO 4Ø,6Ø,8Ø,1ØØ,12Ø,14 Ø,16Ø,19Ø,21Ø,24Ø,26Ø,28Ø,3ØØ,34 Ø,36Ø,38Ø,4ØØ

40 PRINT@162, "ANGELS WE HAVE HEARD ON HIGH";

5Ø PLAY"T202L4BBB03DL4.DLBC02L2B L4BAB03DL4.02BL8AL2GL4BBB03DL4.D L8C02L2BL4BAB03D02L4.BL8AL2G03L2 DL8EDC02B03L2CL8DC02BAL2B03L8C02 BAGL4.AL8DL2DL4GAB03C02L2BL4AP40 3L2DL8EDC02B03L2CL8DC02BAL2B03L8 C02BAGL4.AL8DL2DL4GAB03C02L2BAL1 G":GOTO 43Ø

60 PRINT@162, "AWAY IN THE MANGER";

7Ø PLAY"T202L4DGGL8BAL4GGDEGEL2D L4DGGABBO3DD02BGL2AL4DGGL8BAL4GG DE03C02EL2DL4DGGAB03DC02BDF#L2G" :GOT0 43Ø

8Ø PRINT@162, "DECK THE HALL";

9Ø PLAY"T303L4.C02L8B-L4AGFGAFL8 GAB-GL4.AL8GL4FEL2F03L4.C02L8B-L 4AGFGAFL8GAB-GL4.AL8GL4FEL2FL4.G L8AL4B-GL4.AL8B-03L4C02GL8AB03L4 CL8DEL4FEDL2CL4.C02L8B-L4AGFGAF0 3L8DDDDL4.C02L8B-L4AGL2F":GOTO 4 3Ø

100 PRINT@162, "THE FIRST NOEL"; 110 PLAY"T202L8EDL4.CL8DEFL2GL8A B03L4C02BAL2GL8ABL403C02BAGAB03C 02GFL2EL8EDL4.CL8DEFL2GL8ABL403C 02BAL2GL8AB03L4C02BAGAB03C02GFL2 EL8EDL4.CL8DEFL2G03L8C02BL2AL4AL 2.G03L4C02BAGAB03C02GFL1E":G0T0 430

120 PRINT@162, "GOD REST YOU MERR Y, ";: PRINT@194, "GENTLEMEN";

13Ø PLAY"T302L4DDAAGFEDCDEFGL2.A L4DDAAGFEDCDEFGL2.AL4AB-GAB-03CD 02AGFDEFL2GL4FGL2AL4B-AAGFEL2DL8 FEL4DL2GL4FGAB-03CD02AGFEL1D":G0 TO 43Ø

140 PRINT@162, "HARK THE HERALD A NGELS SING";

15Ø PLAY"T302L4DGL4.GL8F#L4GBBA0 3DDL4.DL8C02L4BAL2BL4DGL4.GL8F#L 4GBBA03D02AL4.AL8F#L4F#EL2D03L4D DD02G03C02BBA03DDD02G03C02BBA03E EEDC02B03L2C02L4AL8B03CL4.D02L8G

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The most powerful disk-based editor/assembler for the Color Computer (requiring 32K) available and is a "must" for anyone considering the development of machine language programs. The assembler accepts all standard Motorola mnemonics for the 6809 instruction set as well as all standard 6800 and 6801 mnemonics. Macros and conditional assembly are supported as well as numerous other directives for convenient assembler control and will allow multiple origins placed anywhere in the source file. The assembler executes in two passes and can accept any size file so long as there is sufficient memory to contain the cross reference symbol table. Output is in the form of a binary disk file as well as an assembled listing output which may be routed to a printer or to a disk file. The assembler will also support a very powerful system of library files which allows tremendous programming flexibility.

The powerful line oriented Editor is easy to learn to use and has the most extensive set of commands of any editors on the market. It will allow global or programmably partial changes. block moving/copying, string searches, multiple repetitions of the same command and 13 other commands. ULTRA 80CC comes with complete 68-page documentation.

49.95

ORACLE (Graphic Monitor)

Are you tired of writing machine language graphic programs with no way to debug them easily? Now your problems are solved, the ORACLE is here! You may pre-define a graphic page and mode which is displayed when you hit the clear key. Hitting clear again returns you to the alpha screen and page. You may run the program with breakpoints and the ORACLE will automatically set up the pre-defined graphic page when you execute it and return to the alpha display when the breakpoint is encountered.

Twenty-three commands including memory move, fill, search, alter and display are supported. Hex and ASCII dumps, hex/decimal and decimal/hex conversion is provided along with a tape-to-disk transfer for machine language files. The computer's memory is displayed and/or altered in a live screen mode with the arrow keys controlling the cursor.

The ORACLE is completely position independent and requires 3K of RAM. When used with the Supercharger, it may be located at \$EOOO to allow maximum free RAM below \$7FFF.

ULTRA 80CC plus the ORACLE monitor is the most powerful programming tool available for the TRS-80 Color Computer. 74.95

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If you have a 32K E series printed circuit board, the SUPER-CHARGER will let you switch your computer to full 64K RAM mode. It just plugs into the ROM PAK port and you can use BASIC or not as you wish. NO MODIFICATION is needed and it will not void your warranty. It allows you to still plug ROM pack and/or the disk controller board into the computer, Allow machine language access to all 64K RAM in a Series E PC board.

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GNT gives the Extended Basic TR-80 Color Computer the capability of intermixing text and graphics on a high resolution screen (PMODE 3 or 4). GNT supplies a complete character set, including true lower case, that can be used with simple PRINT and PRINT @ statement. You can program the size of the scrolling 'window' of GNT text, and turn GNT on or off with simple Basic POKE statement. GNT comes with a modification program, CHRGEN, which lets you domify and create GNT character sets in any colors and typefaces you choose. It is simple to use because the text it provides is in the same format of the standard text screen: 16 lines by 32 characters. This means that you can use the normal PRINT @ values for 0 to 512. You can easily adapt your present programs to use GNT; anything you can print on a text screen you can print with GNT.

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ASSULATES

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L4GAL2B03L4EEEDC02B03L2C02L4AL8B 03CL4.D02L8GL4GAL2G":GOTO 43Ø 16Ø PRINT@162,"HAVE YOURSELF A M ERRY LITTLE";:PRINT@194,"CHRISTM AS";

17Ø PLAY"T202L4CEG03C02L8GFEDL4C DCEG03C02L2.GP4L4EG03CEL8DC02BAL 4GFL1EL2.EP4L4CEG03C02L8GFEDL4CD CEG03CL2.02GP4L4EG03CEL8DC02BAL4 G#B03L1CCL4EEEL8DC02B03CL2DL8C02 BAB03L2C02L4BL2.BP403L4CCC02L8BA GAL2BL8GAB03CL2D02L4DL2.GP4L4CEG 03C02L8GFEDL4CDCEG03C"

18Ø PLAY"L2.02GP4L4EG03CEL8FEDC0 2L4B03DL1EL2.EL4EE02FA03CL8EDC02 BL4AB03L1C":GOT0 43Ø

19Ø PRINT@162,"I SAW THREE SHIPS ";

200 PLAY"T202L8DL4GL8GL4AL8B03L4 D02L8BL4A03L8C02L4BL8GL4GL8BL4AL 8F#L4DL8DL4GL8GL4AL8BL403D02L8BL 4AL803C02L4BL8GGABL4.AL4G":GOTO 430

21Ø PRINT@162, "JINGLE BELLS"; 22Ø PLAY"T402L4DBAGL2.DL8DDL4DBA GL2.EL4EE03C02BAL1F#03L4DDC02AL1 BL4DBAGL2.DL8DDL4DBAGL2.EL4EE03C 02BA03DDDDEDC02AL2.GP4L4BBL2BL4B BL2BL4B03D02L4.GL8AL1B03L4CCL4.C L8CL4CO2BBL8BBL4BAABL2AO3DO2L4BB L2BL4BBL2BL4BO3DO2L4.GL8AL1BO3L4 CCL4.CL8CL4CO2BBL8BB"

23Ø PLAY"03L4DDC02L4AL16":GOT0 4 3Ø

240 PRINT@162, "O CHRISTMAS TREE"

25Ø PLAY"T202L4CL8.FL16FL4FGL8.A L16AL4AAL8GAL4B-EGFCL8.FL16FL4FG L8.AL16AL4AAL8GAL4B-EGF03CL8C02A 03L4.DL8CC02B-L4.B-L8B-B-G03L4.C 02L8B-B-AL4ACL8.FL16FL4FGL8.AL16 AL4AAL8GAL4B-EGF":GOTO 43Ø 26Ø PRINT@162, "SILENT NIGHT"; 27Ø PLAY"T202L4.GL8AL4GL2.EL4.GL 8AL4GL2.E03L2DL4D02L2.B03L2CL4CO 2L2.GL2AL4A03L4.C02L8BL4AL4.GL8A L4GL2.EL2AL4A03L4.C02L8BL4AL4.GL8A L4GL2.E03L2DL4DL4.FL8D02L4B03L

28Ø PRINT@162, "UP ON THE HOUSE T OP";

2.CEL4.CO2L8GL4EL4.GL8FL4DL1C":G

29Ø PLAY"T303L4CL8CDL4C02AFA03L2 CL4DDC02AG03CL2CL4CL8CDL4C02AFA0 3L2CL4DDC02AG03C02L2FL4B-B-03L2D L4CL8CC02L2AL4GGL2B-L4A03L8CC02L 2F03L4CL8CDL4C02AB-03CL2DL4CL8CD CC02L4AG03C02L2F":G0T0 43Ø

cugar Coftware

Silly Syntax

a sensational and educational version of a popular party game for the TRS-80* Color Computer...

For 1 to 10 players. Load a story into the computer. The players are asked to supply a noun, verb, part of body, celebrity, etc. which the program uses to complete the story. The story, which is displayed when all words are entered, will be hilarious. Silly Syntax requires 16K Extended Basic (32K for disk version). For \$19.95, you get a user guide and a tape containing the Silly Syntax game and 2 stories. You can create your own stories or order story tapes from the selection below.

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TRS-80 is a trademark of Tandy Corp.

Introduces

OTO 43Ø

Auto Run

Auto Run is a utility program for the TRS-80* Extended Basic Color Computer. It is used to add convenience and professionalism to your software.

Auto Run will create a tape which will consist of a machine language loader followed by your Basic or machine language program. With this tape, a simple CLOADM command will load and start the loader which will load and start your program. You may design a title screen with the graphics editor which will display as your program loads. Also you may record a vocal or musical introduction preceding your program. The Auto Run loader will control the audio on/off.

Basic programs can be set to load anywhere in memory above \$600 (the PCLEAR 0 page).

Software authors: The Auto Run prefix may be appended to your software products.

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300 PRINT@162, "HAVAH NAGILAH";
310 PLAY"T502L2EL2.EL4G#FEL2G#L2.G#L4BAG#L2AL2.A03L4C02BAL2G#L6F
EFL1G#L2EL2.EL4G#FEL2G#L2.G#L4BAG#L2AL2.A03L4C02BAL2G#L6FEFL1EL4
G#L2G#L4FEEL2EL4FL2FL4EDDL2DDL4.FL8EL4DDL2AG#L6FEFL1G#L4G#L2G#L4
FEEL2EL4FL2FL4EDDL2DDL4.FL8EL4DDL2AG#L6FEFL1G#AAL2AAAA"

32Ø PLAY"T502L8AAL4A03L4.C02L8BL 4A03C02BAL8AAL4A03L4.C02L8BL4A03 C02BAL8BB"

33Ø PLAY"L4B03L4.DL8C02L4B03DC02 BL8BBL4B03L4.DL8C02L4B03DC02BL8B BL4B03L2EP102L4.EL8E03C02BAG#L1A L2EL2.EL4G#FEL2G#L2.G#L4BAG#L2AL 2.A03L4C02BAL2G#L6FEFL1E":GOTO 4 3Ø

34Ø PRINT@162, "MA-OZ TSUR"; 35Ø PLAY"T202L4FCFB-AGFP8L803CL4 CD02GL8AB-L4AGL2FL4FCFB-AGFP8L80 3CL4CD02GL8AB-L4AGL2F03L4.CL8CL4 DEL2FCL4FEDCL8C02B-AB-L2GL4.AL8B -03L4C02AL4.GL8AL4B-P8L8B-L4AGFB -AGL2F":GOTO 43Ø

36Ø PRINT@162, "CHANUKOH, DY CHAN UKOH";

37Ø PLAY"T202L4DL8AAAA03DD02AAL4 AL8GFL4GL8FFAAAA03DD02AAL4AL8GFL 4GFL8FGAGL4FFGL8FEL2FL8FGAGL4FFG L8FEL4DDAL2AL4DAL2AL4DAL8AAL4B-L 8AGL2.AP4L4AL8AAL4B-L8AGL4AL8AAL 4B-L8AGL4FL8FFL4GL8FEL2.D":GOTO 43Ø

380 PRINT@162, "MARCH OF THE TOYS

39Ø PLAY"T403L8CD02A03CL2.02DEL4 AL8FL2DL8CL4EL8DL1DL8CGEDL1DP803 L8CD02A03CL2.02DEL4FL8GL2AP8L8A0 3L4EL8DL4C#02L8A03L4EL8DL4C#02L8 A03FEDL1AP8L8CD02A03C02L2.DEL4AL 8FL2DL8CL4EL8DL1DL8CGEDL1DP803L8 CD02A03C02L2.DEFGL8AB-03C02AGFL4 AL8DL4GL8CL1F":GOTO 43Ø

400 PRINT@162, "SEMPER FIDELES"; 410 PLAY"T402L8F#L4GL8AL4BP8L2BL 8AGFGADP8DAP8AGP8GEP8EFP8F03CP8C 02BP8BAP8AGP8G03EP8EDP8DCP8C02L4 BP8L2BL8AGFGAEP8EAP8AGP8GEP8ED01 B02DGDGBGAB03CC#DP8L8FDC01AG02GA B03CDL4.EG02AB03L4DL8CL2CL8CECEC 02L4B02L8FL2F02L8B03D02B03D02BL4

03CL8EL2E02L8GAB03CDL4.EG 42Ø PLAY"02L4.AB03L4DL8CL2CL8C02 B03CDD#EGECECL102GL8AL4BL8G03L4C P802L4.CL1AL8FA03L4C02L8A03L2.CO 2AL1FL8CFL4AL8FL2.CL4.C03L4.C02L 1AL8FA03L4C02L8A03L2.C02AL1CL8FA

03L4C02L8CL1F":GOTO 43Ø 43Ø GOTO 1Ø



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Patch EDTASM+ To Disk To End Those Cassette Blues

By Roger Schrag

Radio Shack's EDTASM+ package is a powerful, well-written programming tool. But for people with disk drives, it is very agonizing to have to go back to using cassettes to store source code files. There are editor assemblers on the market that do support disk drives, but they are usually much more expensive, and sometimes require the Flex Operating System, or something else that not everyone owns.

What I have put together here is a series of patches that make EDTASM+ use the disk drive instead of the tape recorder for mass storage. The finished product requires

only 16K Extended Basic and one drive.

Patching EDTASM+ to use disks is relatively easy to do. The first thing is to move it into RAM so that we can alter bytes of code and thus alter its operation. The move can be accomplished by typing in U C000 1000 27FF from Zbug. To save a copy of it on tape, enter P EDTASM 1000 37FF 1000. Since it was written entirely in position independent code, it can reside anywhere in memory, and function without modification.

The next step is to enter the source code shown in the listing. Assemble it onto tape directly after the copy of EDTASM+ you made from Zbug. You'll probably also want to save the source code for future use.

Now you are ready to load in the files you have saved on the tape. First, you will want to insert your disk cartridge so that the finished product can be saved on disk. Type CLOADM to load the RAM version of EDTASM+, but don't execute it yet. Next, load in the patches you keyed in by typing CLOADM again. Parts of EDTASM+ will now be overwritten with new code, and a block of additional subroutines will be added on.

You may save the finished program onto disk by typing in SAVEM "EDTASM+," &HE80, &H37FF, &HE80. Now whenever you want to use your editor assembler, just enter LOADM "EDTASM+":EXEC.

with the disk version of EDTASM+, the L,W,A, and V commands will work differently than they used to. To load source code, simply press L and enter. The computer will ask for a filename. Type in a standard filename as you would in Basic. If you don't specify an extension, none will be assumed. The file will then be loaded. The W command works in the same way.

To assemble a program, type in A and any assembly switches you would like to use. Unless you choose the IM or NO options, you will be asked for the filename. As the listing scrolls across the screen, the computer will stop from time to time to write a sector to the disk. If you press Break, you may have to wait a moment for the computer to close the file.

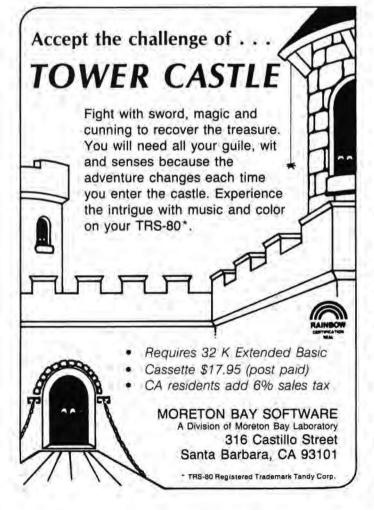
The V command will merely open a file and close it again. This verifies that a file is listed in the directory and that there

are no problems with its structure.

On a 16K machine, you will have 1.5K for your text buffer. A 32K machine will offer 17.5K. For those of you who have source code files on tape, you may transfer them to diskette with the Basic program I have included. EDTASM+ uses ASCII codes that Basic doesn't recognize. Therefore INPUT#-1 can't be used to read the source code file from the cassette. A machine language routine is necessary.

```
00002 * EDTASM+ HITS THE DISK *
99993 **************
99994 *
00005 *BY ROGER SCHRAG
99996 *
          10/15/82
99997 *
SSSSR *
00009 *MAKE SURE INTERRUPTS ARE ENABLED
96918 *SD THAT THE DISK DRIVE WILL
00011 *SHUT OFF PROPERLY
99912
              ORG
                      $1516
99913
              LBSR
                      INTRPT
99914 +
00015 *
90016 *CHANGE FILENAME HANDLING SYSTEM
90017 *TO ALLOW THE USER TO ENTER FULL
90018 *DISK FILE NAMES: FILENAME/EXT:D
99919
              ORG
                      $15EØ
99929
              LBRA
                      FNAME
00021 *
99922 *
99023 *CHANGE REFERENCES TO DEVICE #-1
00024 *(TAPE) TO DEVICE 01 (DISK)
90025
              ORG
                      $1547
00026
              LDB
                      #1
99927
              DRG
                      $1574
00028
              LDB
                      #1
00029
              ORG
                      $15AD
00030
              LDA
                      #1
99931
                      $15CD
00032
              LDA
                      #1
00033 *
00034 ¥
90035 *MAKE SURE THE DISK FILE HAS BEEN
00036 *CLOSED WHEN ACCESS TO IT IS COMPLETE
00037
              ORG
                      $1852
66638
              LBSR
                      CLOSE
00039 *
00040 4
00041 *AT THE RIGHT TIME, CALL A ROUTINE
00042 *TO OPEN THE DISK FILE. INSTEAD OF
00043 *A ROUTINE TO OPEN THE TAPE FILE
99944
              ORG
                      $15BA
                              PATCHES INTO
                      #ASSEM "A" COMMAND
00045
              LDU
```

1.0				
00046		ORG	\$158F	PATCHES INTO
99947		LDU	#LOAD	"L" COMMAND
00048		ORG	\$15C4	PATCHES INTO
88849		LDU	#WRITE	"W" COMMAND
00050		ORS	\$163A	PATCHES INTO
99951		LDU	#LOAD	"V" CONMAND
00052	+			
00053				
99954	*ALTER	ERROR H	ANDLING S	YSTEM TO
00055	+ACCOU	NT FOR N	EW ERROR	MESSAGES
00056		DRG	\$1721	
99957		LBSR	ERROR1	
99958		CLR	<\$1	
99959		CLR	(\$4	
99969		LBSR	ERROR2	
99961		LBRA	\$172F	
00062	*			
99963	*			
00064		DRG	\$E80	
60065	*			
99966	*			
90067	*NEW EN	TRY ARE	A TO EDTA	SM
99968	START	LDX	#\$1E00	WE MUST FIRST
99969		LDA	#SAF	FIX THE THREE
99979		STA	, X+	BYTES THAT
90071		LDA	#\$5A	BASIC CLOBBERS
99972		STA	, X+	WHILE LOADING
90073		LDA	#\$26	EDTASM+ INTO
99974		STA	, X	MEMORY



99975		LDA	#\$38	NEXT SET THE
99976		STA	>\$FF	LOW MEN POINTER
99977		LBRA	\$1995	ENTER PROGRAM
00078	*			
99979				
				THE PROGRAM
		S TO EN	ABLE THE	NEW FEATURES
00082				
00083				
			Calculation of the col-	SO THAT THE
			eren veryger e	OFF CORRECTLY
			ONDS OF	NOT BEING USED
	INTRPT			CLEAR B
99989		TFR	B, DP	CLEAR DP
99989		ANDCC	#9	ENABLE INTERRUPTS
99999		RTS		RETURN TO PROGRAM
00091				
99992				
		FILES &		TO PROGRAM
00094	CLOSE	JSR	\$CA3B	CLOSE FILES
99995		LBRA	\$1377	RETURN TO PROGRAM
66696	*			
99997				
89898	*ROUTIN	E TO ALI	DOM AOT	TO ENTER A
00099	*NAME F	OR THE	DISK FIL	E
99199	FNAME	PSHS	Ü	SAVE U
00101		LEAX	PROMPT	PER "FILENAME?"
99192		LBSR	\$1221	PRINT PROMPT
00103		LBSR	\$1EC6	GET USER INPUT
88184		LDB	(\$12	GET LENGTH OF INPUT
00105		LDX	(\$13	GET ADDRESS OF INPUT
99195		PSHS	DP	SAVE DP
86187		CLRA		CLEAR A
90198		TFR	A, DP	CLEAR DP
00109		LEAY		CR SAVE A RETURN
99119		PSHS	Y	ADDRESS ON STACK
00111		CLR	,-S	LOWER STACK
00112				SET DEFAULT
00113				DRIVE NUMBER
00114		LDV	1494	NAME STORAGE AREA
00115		I DA	3470	ASCII SPACE
				ERASE FILENAME
00117	LIMOL	CNPV	#1957	STORAGE AREA
99118			ERASE	
99119				GO GET FILENAME
88128				RETRIEVE DP
00121	MICH			RETRIEVE U
00122				RETURN TO PROGRAM
	PORMOT	ECC	*FILEN	AME 24
90124				TERMINATOR
00125		res	PMV	TERRITARION
99126				
and in market		EG TO 0	EN A 81	OV ETLE
				SK FILE
				LIGHT DIFFERENCES
				ASSEMBLE MORE
				(1) NPUT MODE
		LDX	42111	ASCII FORMAT
99132	WD175	BKA	UPEN	GO OPEN FILE
	MKITE	LDA	#\$4F	(O)UTPUT MODE
66134		LDX	#\$155	ASCII FORMAT

Color Computer Expansion Interface







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99135		BRA	OPEN	GO OPEN FILE
88136	ASSEM	LDA	#\$4F	(O) UTPUT MODE
99137		LDX	#\$200	BINARY FORMAT
99138	OPEN	STX	\$957	STORE FORMAT
00139		LDX	#\$166	RECORD LENGTH
88148		STX	\$97C	IS 256 BYTES
00141		LDB	#1	USE DEVICE #1
00142		JMP	\$C468	GO OPEN FILE
00143	+			
00144	*			
99145	*ALTER	ERROR H	ANDLING R	OUTINE TO
99146	*HANDLE	NEW DI	SK RELATE	D ERRORS:
99147	* DF V	F NE WP	FN FM	
00148	#IF NOT	ONE OF	THOSE, T	HE ERROR
00149	*IS ASS	UNED TO	BE IO	
00150	ERROR1	EXB	A, B	CODE INTO A
00151		CLRB		CLEAR B
00152		LDX	#CODES	LIST OF ERRORS
00153	BETERR	CMPA	B, X	COMPARE CODES
00154		BEB	RET	RETURN IF MATCH
00155		TST	B, X	SEE IF AT END
00156		BED	RET	RETURN IF SO
00157		INCB		GET NEXT CODE
99158		BRA	GETERR	LOOP BACK
00159	RET	RTS		RETURN TO PROGRAM
99169	ERROR2	LEAX	ERRS, PC	R MESSAGE TABLE
00161		LBRA	\$121E	GO PRINT MESSAGE
00162	*	-		
99163	*			

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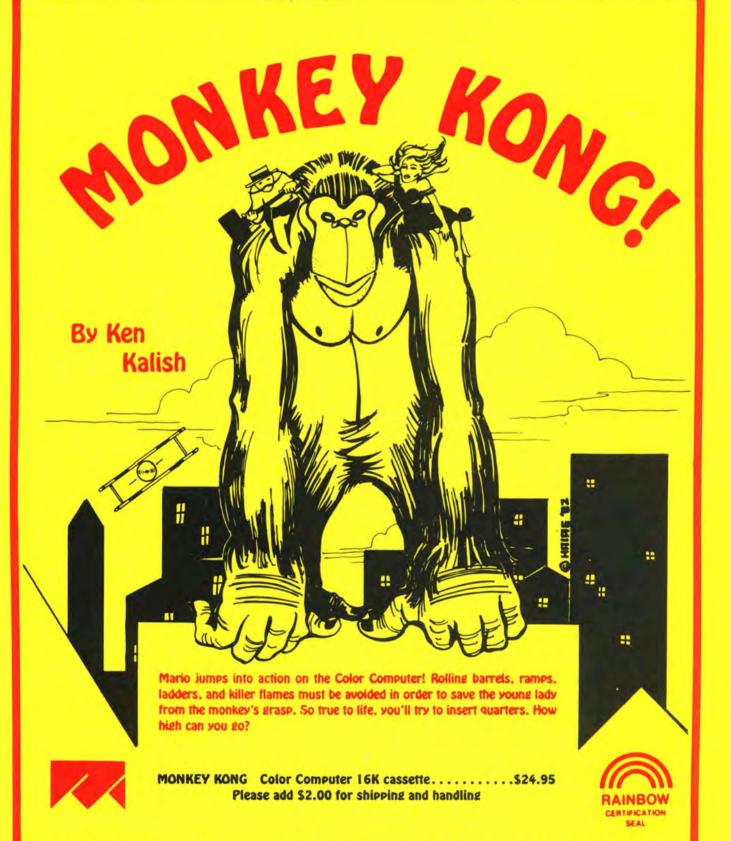
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99164	*LIST	OF ERROR	CODES	
80165	CODES	FCB	\$38	DF
99166		FCB	\$32	VF
88167		FCB	\$34	NE
99168		FCB	\$3C	WP
99169		FCB	\$3E	FN
99179		FCB	\$2A	FM
88171		FCB	\$9	
99172	*			
00173				
99174	*LIST	OF ERROR	MESSA	SES
99175	ERRS	FCC	*DIS	(FULL*
99176		FCB	\$AØ	TERMINATOR
00177		FCC	#VER	FICATION ERROR*
99178		FCB	\$AØ	TERMINATOR
99179		FCC	*FILE NOT FOUND*	
99189		FCB	\$AØ	TERMINATOR
00181		FCC	*WRITE PROTECT*	
99182		FCB	SAG	TERMINATOR
00183		FCC	*BAD	FILENAME*
99184		FCB	SAB	TERMINATOR
00185		FCC	*BAD	FILE MODE*
99186		FCB	SAB	TERMINATOR
86187		FCC	*I/O ERROR*	
99188		FCB	\$A9	TERMINATOR
99189		END	STAR	

Listing 2:

- 1 'UTILITY TO TRANSFER EDTASM+ 2 'TEXT FILES FROM TAPE TO DISK
- 3 CLS
- 4 PRINT"EDTASM+ SOURCE CODE"
- 5 PRINT"FILE TRANSFER UTILITY"
- 6 PRINT STRING\$ (32, "=")
- 7 CLEAR500, 16308: DEFUSR0=16310
- 8 FOR X=1631Ø TO 16318
- 9 READ Y: POKE X, Y
- 10 NEXT X
- 11 DATA 173, 159, 160, 4
- 12 DATA 173, 159, 160, 6
- 13 DATA 57
- 14 PRINT"ENTER THE NAME OF THE"
- 15 LINEINPUT"TAPE FILE: "; I\$
- 16 PRINT
- 17 PRINT"ENTER THE NAME OF THE"
- 18 LINEINPUT"DISK FILE: "; O\$
- 19 AUDIO ON: OPEN"I", #-1, I\$
- 20 OPEN"O", #1, O\$: GOTO 22
- 21 X=USR(Ø):MOTOR OFF
- 22 IF PEEK(129)>Ø THEN 29
- 23 IF PEEK (124) = 255 THEN 3Ø
- 24 X\$=CHR\$(Ø):X=VARPTR(X\$)
- 25 POKE X, PEEK (125)
- 26 POKE X+2,1:POKE X+3,218
- 27 PRINT X\$;:PRINT#1, X\$;
- 28 GOTO 21
- 29 PRINT"?IO ERROR":GOTO 31
- 30 PRINT"TRANSFER COMPLETE"
- 31 CLOSE: END



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By Peter Stumpf



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The listing:

1 REM ************ 2 REM * CHRISTMAS SCENE 3 REM ********** 4 REM * BY PETER STUMPF 5 REM * 1508 APPALOOSA 6 REM * MC HENRY, IL REM * 60050 8 REM ************

10 PMODE4, 1: PCLS: SCREEN1, 1 12 PMODE3 19 REM *** DRAW CHIMNEY *** 20 LINE (78, 120) - (178, 192), PSET, B 25 DRAW"BM208,191U101L25L14U72L8 3Ø DRAW"BM48,191U1Ø1R3ØR1ØU72 31 PAINT(100,20),2,4 32 PAINT(1,1),3,4:PAINT(178,1),3 33 REM *** DRAW BRICKS ON *** 34 REM *** LOWER CHIMNEY *** 35 FOR X=186 TO 12Ø STEP-6 4Ø LINE(48, X)-(78, X), PSET 45 NEXTX 5Ø FOR X=186 TO 12Ø STEP-6 55 LINE(178, X)-(208, X), PSET **60 NEXT** 63 REM *** DRAW BRICKS ON *** 64 REM *** MIDDLE CHIMNEY *** 65 FOR X=120 TO 86 STEP-6 7Ø LINE(48, X)-(208, X), PSET 75 NEXT 8Ø FOR X=12Ø TO 18 STEP-6 85 LINE(88, X) - (166, X), PSET 9Ø NEXT 155 LINE (59, 191) - (59, 91), PSET 16Ø LINE(68,191)-(68,91),PSET 165 FOR X=78 TO 203 STEP10

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```
17Ø LINE(X,12Ø)-(X,91),PSET
175 NEXT
18Ø LINE(189,12Ø)-(189,191),PSET
185 LINE(199, 120)-(199, 191), PSET
19Ø FOR X=98 TO 163 STEP 1Ø
195 LINE(X,91)-(X,18),PSET
200 NEXT
204 REM *** DRAW STOCKINGS ***
205 DRAW"S2BM110.120D25G15L10H4U
4E4R6E6U22R12":PAINT(109,125),6,
210 DRAW"S2BM138,120D25G15L10H4U
4E4R6E6U22R12":PAINT(137, 125),4,
215 DRAW"S2BM165,12ØD25G15L1ØH4U
4E4R6E6U22R12":PAINT(163,122),3,
216 GOTO 275
219 REM *** DRAW LOG HOLDER ***
22Ø DRAW"S4BM98,182L4D8R4U8R6ØD8
R4U8L4R4E8L1G7L67H7R1F8
223 REM *** PLAY JOLLY OLD ***
224 REM *** 'ST. NICHOLAS'
225 V1$="T303L4AAAAGGL2GL4FFFFL1
Α"
23Ø V2$="L4DDDDCFL2FL4GFGA"
235 PLAYV1$+V2$+"L16"
24Ø PLAYV1$+V2$+"L1F"
244 REM *** DRAW FLAME ***
245 COLOR6: DRAW"S6BM107, 171E6F4E
4F7E4F6D2L33U5":PAINT(1ØB,171),6
,6
249 REM *** ERASE FLAME ***
250 COLOR5:LINE(101,150)-(160,18
Ø),PSET,BF
254 REM *** DRAW 2ND FLAME ***
255 COLOR6:DRAW"S6BM1Ø7,171E3F4E
7F5E5F8D2L33U5E2":PAINT(1Ø8,171)
,6,6
259 REM *** ERASE 2ND FLAME ***
26Ø COLOR5:LINE(105,150)-(160,17
6), PSET, BF
265 GOTO 245
269 REM *** DRAW THE WORDS
27Ø REM *** MERRY CHRISTMAS ***
275 CLEAR 2000
28Ø SPACE$="BM+7.Ø"
285 A$="U4;E2;F2;D2;NL4;D2;BM+3,
ø"
29Ø C$="BM+1,-Ø;H1;U4;E1;R2;F1;B
M+Ø, +4; 61; L2; BM+6, Ø"
295 E$="NR4; U3; NR2; U3; R4; BM+3, +6
300 H=="U3; NU3; R4; NU3; D3; BM+3, +0
3Ø5 I$="BM+1,Ø;R1NR1U6NL1R1;BM+4
,6"
310 M4="U6; F2ND1E2D6; BM+3.0"
315 R$="U6;R3;F1;D1G1L2;NL1;F3;B
M+3.0"
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32Ø S\$="BM+Ø,-1;F1R2E1U1H1L2H1U1 E1R2F1;BM+3,+5" 325 T\$="BM+2,+Ø;U6;NL2;R2;BM+3,6" 33Ø Y\$="BM+Ø,-6;D2F2ND2E2U2;BM+3,6" 335 DRAW "BM25,15S8":DRAWM\$+E\$+R \$+R\$+Y\$+SPACE\$ 34Ø DRAWC\$+H\$+R\$+I\$+S\$ 345 DRAWT\$+M\$+A\$+S\$

Software Review ...

H.E.M. Can Give You An Expense "Handle"

Is chewing gum food? Or, is it "entertainment?" And, how about alcohol? Do David and I really spend \$200 a month on lunch? And, did we eat more in February than March, or did we just pay more for the food we ate? Do you mean to tell me that so far this year we have spend more on expenses for our TDP-100 than we have on groceries? I seem to be getting more questions than answers as I review Household Expense Manager and try to get a "handle" on our household budget.

My friends tell me I am quite organized and I've always more or less agreed with them. I mean, I do have a place for everything and like to keep everything in its place. My recipes are all on index cards and kept in a neat file. Our entire collection of record albums is in alphabetical order. I can place my hands on any book we own in a matter of seconds. I have every warranty and instruction sheet for every item we have purhcased in 14 years of marriage, and our basement is even orderly. So, how come I have only a wild guess about how much money the two of us spend on entertainment each month?

Household Expense Manager is a set of programs designed for creating and maintaining a data file of 30 household expense categories. It was handed to me to review because certain people identified me as a "nautural" since I happen to pay for just about everything by check and do take pride in exercising a degree of control over my life. This review may just blow my image.

The most significant realization I have come to from running H.E.M. is that I have to admit that I simply don't know how much we do spend on certain budget items. A friend of mine snickered when I entered \$40 for lunch for a month for both David and myself—we both work. He pointed out that we must live on bread and water—and dayold bread at that. A bit of mental calculation told me that perhaps \$200 rather than \$40 would be more like it. When I put down \$15 a month for gasoline and oil, he laughed out loud. Again, I came to a radically different sum when I acutally was forced into thinking about it.

There's no doubt about it; *H.E.M.* makes you think. I found the "year to date" and "month to date" options most useful, because, if you really sit down and earnestly try to acount for where your money has gone, you do learn something. After listing as much as I could in every category, I saved the data file to tape, erased the "ENTRY" subroutine and loaded "LIST."

With "LIST," I reviewed my totals for the various entries and also made montly and yearly printouts. A printer is not absolutely necessary, but it sure makes things more orderly. It made me feel a lot more in control to have the itemization down on paper. Lastly, I loaded up "ANALYSIS" to see what it would do for, or do to, me.

"ANALYSIS" is a comparison program. For instance, with this subroutine, you can compare June's expenses with October's and the program runs a colorful bar graph indicating the expense ratio. While this is a very impressive bit of graphic display, I found that it brought more questions to my mind than it did answers. Why is the telephone bill twice as much in October as it is in June? Is there a pattern or cycle to our telephone expenses? With H.E.M., you can find out things like that. The best thing is that H.E.M. gives you a place to start and a plan of action to bring your household budget into some kind of respectable shape. You still have to dig out all the receipts, old checks and such yourself, but you just key in the amounts and H.E.M. keeps a running total.

Household Expense Manager also asks you on certain entries if a portion of it is tax deductible and keeps a separate subtotal of tax deductible items, but I found that the breakdown was not really specific enough to be of much value in preparing tax returns. However, the documentation points out that H.E.M. is user modifiable, so I guess you could modify this portion to suit your own individual needs. I found it rather easy to simply replace some of the categories that were of little concern to me with budget items that we, ourselves, spend a sizable chunk of money on.

A new one I added, for instance, was "computer expenses." I also considered "magazines," a passion of David's, and "record albums," a passion of my own. I also reconsidered some of my own considerations. For instance, when I suggested that "David's paperback books" be a separate itemization, he countered with "cat food, toys and supplies." If there's a breakout of "shop tools," does that entail keeping a close watch on "kitchen appliances?" Clearly, things could get sticky if we decided to carry things too far.

A separate subroutine provided in Household Expense Manager really is an "other than household expense" program. "EXPACCT" provides a means for keeping a cassette diary of travel expenses, not than I plan to pack my TDP-100 along with me when I go out of town. But, again, it does help you organize your travel expenses and even subtracts your expenses from your travel advance, in the case of business trips, and tells you whether the company owes you, or you have to spend more to eat up your advance.

The best feature of "EXPACCT" is that you can search your data files based on cross-reference criteria. That is, if you can't remember off the top of your head the date of your trip to the Windy City, you can simply key in "Chicago" and search the files by city name rather than date. If you spent a night at some unmemorable wide place in the road in the boonies, and can't remember the date or the location, you can search the files by the name of the hotel. If you can't recall any of the above, you can still find your data file by keying in the purpose of the trip. And, if you still need help, well, chances are it is neither reimbursable nor deductible, anyway.

Loading subroutines and saving data files can be quite tedious if you're trying to assemble a lot of data and you begin to see the value of a disk drive when using H.E.M. if you're among those of us who use a cassette recorder.

Generally, however, I found Household Expense Manager to be a helpful program that is easy to operate, one that can show you where your money's going and—if the shoe fits—where you may be "blowing it."

(Color Software Services, P.O. Box 1708, Dept. R, Greenville, TX 75401, 16K Ext. BASIC, \$19.95.)

-Jenni Khaliel

Let's Take "Basic" Training

By Joseph Kolar

This is the first in a series of articles by Joseph Kolar which will be devoted entirely to the beginning computerist. Mr. Kolar's compassion for the bewildered beginner is expressed in the most earnest and understandable of terms, and we feel that if the novice will follow his suggestions and advice closely, that day when computing becomes more fun than frustration will arrive all the sooner.

In the beginning there was nothing.... Then there was the TRS-80 Color Computer... And then came the newcomer to

computing.

The purpose of this and succeeding articles is to give aid and comfort to the beginner in getting over the rough spots. It is one thing to give a person a color computer and the "getting started with color Basic" manual and wishing him luck. Learning to compute should be a fun thing.

The newcomer to computing knows that there are certain acts of omission and commission in the manual. He senses the need for a magazine, such as the Rainbow, to fill in the gray areas. This has its limitations. He finds it difficult to fathom microcomputer terminology and the attendent jargon.

His requirements are simple:

"Give me information that I can use, in convenient bites and use language that I understand. Be sensitive to my bewilderment, and don't overwhelm me or ignore me. Above all, let me have fun while I learn."

We will not burden him with difficult concepts and

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machine language. We will give help and suggestions, in small increments. We will seem to insult his intelligence by explaining things in detail.

The pep talk is over! You have the color computer and manual. Fingers are itchy. You are ready to begin. Well, not

quite!

The beginner.... You, hereafter, would be well advised to organize your work station. You will save confusion and time. Here is an inexpensive, yet compact set-up: Set up a card table. Place your competer on it in front of the TV. On one side of the computer, locate your cassette recorder. Right in back of it, position a place is container and fill it with a number of pens and pencies. In back of the pencil container, keep your stock of typing paper, and usable scrap paper. Next, at the other side of the computer, keep lessons, magazines and programs you are currently copying or consulting. In back of this area, keep a revolving cassette holder to store your tapes in a compact, yet accessible area.

If your TV has a flat top, you can place a plastic, 3 by 5 note paper dispenser on it. You can use the top of your computer for note-taking. A folded piece of typewriting paper fits very conveniently between the vents. Keep in mind that the air vents are not decorations. Repeat after me, "Never cover the air vents." Speaking of never, never drink or allow anyone to drink or place beverages in your work area. That is a no, no!

A question! Do you find that your manual flops around and is unwieldy and awkward to use? Do you balance it in your lap or lay it on the computer and watch the pages maddeningly flip over, losing your place? Sure, you have! There is a solution that will make Radio Shack richer by

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\$5.95. Invest in a duplicate manual. Keep the original for reference. Cut out the pages from the second manual, by chapters. Place them between the vents of the computer. It is a nifty place, from where you can conveniently key in the programs and follow the lessons presented in the manual. After you master each lesson, chuck the chapter in the trash can. It is a good trade-off and small price to pay for the convenience it will afford.

In learning to compute and program, typing is the name of the game. Nothing happens unless you tickle the keys on the keyboard. If you know how to type, good. If you hunt and peck, good. It is not important how you hit the keys but that you do hit them.

If you can't type, try this. Place your fingers on the ASDF and JKL; keys. Drop your palms to rest on the edge of the computer. Keeping your palms in place (resting on the computer), lift your fingers. This is your typing position. Using any finger you desire, while keeping your palms in place, press the keys that spell your name. If you try to use all your fingers, you will find that you can do a pretty good job. You didn't know you could type did you?

If hunt and peck is your cup of tea, so be it. Any system you use is fine, and speed, though not a requirement, comes with practice.

But, you have to type. Boy, do you have to type! Practice typing programs and text and do whatever exercises the manual demands. Always type a program rather than cload a tape. On the face of it, typing seems to be an unpleasant chore. As you progress, you will find it easier and easier. So

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what if you make mistakes? Join the crowd! You can always correct mistakes.

Be on the lookout for boo-boos you habitually make. For instance, you might strike an R instead of a 4; a C instead of an X; an S instead of a \$; confuse an I for a 1 and an O for a 0 or vise versa; weakly strike a key and not depress it. See what I mean? Check your typing and note the errors you are prone to make. When you run a program you typed in, and it doesn't work properly, look for the errors that are your specialty.

Programs are very demanding. You must type or key them in exactly as they appear right down to the most trivial punctuation mark. Keep in mind that every character, symbol or punctuation mark is an integral part of the program. Leave out so much as a comma, and you will be sorry!

There are three good reasons to practice typing. First, you will become proficient, and typing won't be an ordeal when you are faced with keying in a long program. When you are creating your own programs, you won't lose your train of thought.

Secondly, as you type lines in a program, you will see many familiar lines. You will remember their significance and they will help you to understand other lines. You will find yourself "thinking programming" as you copy the lines.

Finally, certain combinations of letters and words have patterns that your fingers follow. For example: A\$="X." You will always have the pattern, (shift and press \$ with the left hand; shift and strike = with the right hand; shift and strike " with the left hand; and later shift and strike " with the left hand again). That is a hand movement pattern you will use thousands of times. Try RND(X) or CHR\$(128) and you will get different patterns. But, patterns you will repeat ad nauseam. Become familiar with these fingering patterns and you will execute them automatically and correctly after a while.

Improvise a type easel on which to hold the Rainbow and other material to be copied or studied.

You can purchase the Radio Shack typing easal for \$15.95. The drawback is that it consumes valuable desk workspace. It must, by its nature, be folded up and placed elsewhere when space is at a premium, creating clutter. Making clutter is not good planning.

There is an alternative. Put your creative instincts to work. Assume that you have a cassette recorder that is configured like the Radio Shack CRT-80A. Suppose you invested \$1.99 and bought a desk-top calculator stand with an adjustable angle. Could you set the stand to the sharpest angle? Could you attach the recorder on top of it (centered. of course), with a large rubber band just above the row of labeled commands? Is it easier to monitor the counter without straining or shifting about?

Suppose you extended the carrying handle and clipped an ordinary household, spring-loaded clothespin approximately in the middle of the extended handle. If you picked out a Rainbow article you wanted to study or copy, creased it firmly and placed it on top of the recorder butting against the clothespin, would you have a typing easel?

There is a slight trade-off. The calculator stand partially covers the air vents underneath the recorder. But, minimal use in csaving and cloading takes, precludes overheating. It is fairly stable. For the accident prone, add a block of wood or some object under the recorder so it will not tip over. (I use that area as a home for a pocket dictionary.)

Use your native ingenuity to solve this problem. Need I add that wood-butchers among you will have no problem in building a suitable stand? Caution! Leave an open area to accommodate the air vents.

When cloading or csaving to tape, you can drop the plastic cassette box in the space created by the extended carrying arm. The box will be readily accessible in a safe place. Clip the clothespin on the right side of the handle or on the rim of your plastic pencil holder.

You have just created (ah, beautiful word) a dual-purpose tool and conserved precious desk space. Now, if you had a desk lamp in back of the cassette

You may wonder why so much time is being spent yaking about typing skills. It is such an essential part of your study that it is better to get very friendly with the keyboard now, so that later, you can have fun and devote your time and effort to programming.

Do yourself a favor and keep notes on anything you find of interest. Keep track of mistakes you commonly make; things you find difficulty in understanding; paraphrase things you want to remember and write them down. In the next article, we will discuss organizing your notebooks. So, gather notes and have them ready.

A few random thoughts. Buy an inexpensive pair of metal book-ends to store your magazines.

Never, never throw away your old copies of the Rainbow. In fact, make it a point to get the back issues. They contain a wealth of information that you will want to have at your disposal. As your progress, you will be dipping into these invaluable reference materials. In the meantime, get squared away and have fun. Remember, we are on your side!

Hardware Review ...

CoCo Cooler Will Air Out Your Hot Chips

The one problem that we seem to hear the most about as far as the Color Computer is concerned, hardware-wise, is a problem with heat buildup inside the case. Usually traced to the SAM chip, high heat can cause all sorts of problemsusually just when you don't want them.

Enter CoCo Cooler, a simple little device that really isn't as simple as it appears. It is a fan setup that you can easily (yes, really easily) install inside the 80C's case and keep

things, hey, I mean, you know, cool.

CoCo Cooler is a small fan attached to the top of the RF shield that covers the chips inside the case. You simply pry off the old RF shield cover, snap on the one with the CoCo Cooler, attach a (supplied) electric wire and you are in business.

Why the electric wire? Well, first of all, there is no way to get a plug through the air holes in CoCo's case, so you have to do that yourself. Second of all, connecting CoCo Cooler to an internal power supply would have required more soldering and would have drained the internal power.

The instructions were simple (fumblefingers Falk did it with ease); the results gratifying. And, while we wish it had come with an on/off switch, an online switch can be easily purchased at any Radio Shack store and added in a minute or two. For those with a power strip, a switch isn't needed.

Best of all, CoCo Cooler keeps things cool. Our oldest 80C had some heating problems, but no more. Not with CoCo Cooler CoCo Cooling away.

(Spectrum Projects, 93-15 86 Drive, Woodhaven NY 11421, \$49.95 plus \$2 s/h)

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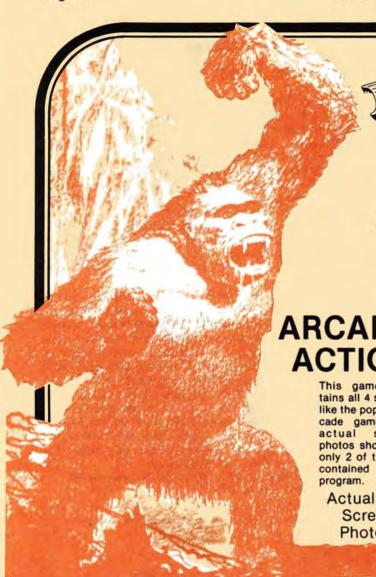
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*Requires Color Computer (@Tandy Corp.) with 32K, Extended Basic and cassette or disk.





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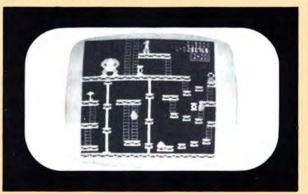
32K Machine Language

\$24.95 TAPE \$27.95 DISK

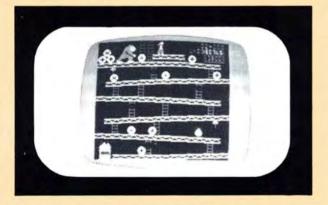
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Using Graphics . . .

High Resolution Graphics Techniques Are Explained

By Don Inman Rainbow Contributing Editor

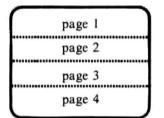


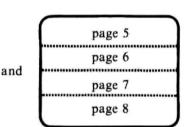


This is the third article of a series on the graphic capabilities of the TRS-80 Color Computer. Last month, we investigated the technique of "turning" pages in PMODE O AND PMODE 1. In those modes, several pages can be used to hold static graphic displays. You can then alternate the page(s) displayed to simulate motion. We will move up to higher resolution this month. Higher resolution requires more graphic pages to fill the screen than lower resolution. Therefore, we must change our method to achieve apparent motion.

PMODE 4

The highest resolution is obtained in PMODE 4. Four pages of graphic memory are needed to fill the video display. Therefore, we have only two full screens to work with.





Since we have only two screens, we can't create much animation by the technique used previously. However, by using the SCREEN statement, we can control the pages being displayed. We can draw on one set of screens while the others are being displayed. If the figures drawn are simple, the time used to display one set of pages will be adequate to provide relatively smooth movement.

Planning Your Moves

The secret of creating sophisticated graphic programs lies in one basic fact. Complex programs are just a combination of a series of short, simple modules. When put together, simple graphic modules form a powerful tool to enhance what might otherwise be a dull program. Don't try to create a masterpiece in one giant step. You can achieve your goal much quicker by using a series of short, well thought out steps.

The first step in planning the graphics portion of a program is a rough sketch of what you want to display. I use a pad of quarter-inch quadrille paper and go through many sketches before I think about writing a program. We'll demonstrate this approach in developing the first program of this article.

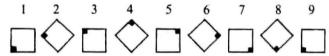
Think of a pair of dice rolling across a gaming table. Now, simplify what you see. Imagine you are looking straight on and see only the face of the dice. Let's go even farther and only consider one die. Don't even consider the spots on the

face of the die. All you really see is a square.

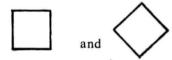


Now, imagine this one, faceless die rolling across the table. Although the die moves in a continuous manner, think of just the simplest positions that it will pass through. Draw one complete revolution, keeping one reference point on the die in mind. Figure 1 shows what I came up with.

Figure 1—Die Roll



Sit back and take a good look at Figure 4. Ignoring the reference point, I see only two basic positions.



This looks like the basis for a crude animation. It may be too simple for your final die roll simulation, but it is a start. Since there are only two positions, we can draw one position on each set of four pages. The program will then become a series of draw, display, erase, move and redraw instructions.

The basic die roll will involve these steps.

- DRAW

 ☐ on pages 1-4 at the left side of the screen.
- 2. Display pages 1-4 and DRAW ♦ on 5-8 at a new position.
- 3. Display pages 5-8 and DRAW □ on 1-4 at a new position.
- 4. Display pages 1-4 and DRAW ♦ on 5-8 at a new position.

Repeat until the right side of the screen is reached,

The Color Computer has all the necessary statements to draw the die.

For the first position
(X1, Y1)

DRAW "BM X1, Y1,; U20 R20 D20 L20"

For the second position
(X2,Y2)

DRAW "BM X2, Y2; H14 E14 F14 G14"

Next, we must consider the X, Y cordinates needed to make a smooth movement across the screen from left to

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Some Plain Talk About a DOS





Why You Should Use STAR-DOS

The Disk Operating System, or DOS for short, is a program which acts as a file manager for a disk. The DOS acts as a buffer between the disk hardware, and the software which uses that disk. Its primary function is to maintain a disk directory on each disk, fetch program or data files from the disk as needed, and store programs or data back on the disk.

When you buy the Radio Shack Disk System for the Color Computer, a Read Only Memory (ROM) integrated circuit inside the disk controller contains those parts of a DOS which change Extended Basic into Disk Extended Basic. Although this Basic allows you to initialize a disk, maintain a disk directory, store and fetch programs and data, and do many other functions of a real DOS, it has one major drawback — it only works with Basic. There is no easy way to integrate it with machine or assembly language programs, and so you are still limited by the speed and power of Basic.

For this reason, many sophisticated Color Computer users are seriously considering switching to another DOS. Some of our competitors are marketing a very flexible DOS, long a favorite among users of larger 6809 systems, which has been adapted to run on the Color Computer. This particular DOS is quite popular among other 6809 users, and there are many available programs which run under it. But it has several disadvantages. It often requires that you void your warranty by opening and modifying the Color Computer. It is completely incompatible with the Radio Shack DOS, and the two cannot read each other's disks. It's also expensive — since you must buy a new Basic to make full use of it (normal Radio Shack Basic disk commands don't work with it), you must pretty much discard all your existing software and start over — new DOS, new Basic, new editor, new text processor, etc. etc.

STAR-DOS is the Solution

STAR-DOS is a real DOS which blends all the best features you want into one DOS. STAR-DOS will run on a standard, unmodified 16K or larger Color Computer using the Radio Shack disk system. Its disk format is fully compatible with Radio Shack Disk Basic — files written by Basic can be read by STAR-DOS and vice versa. Since there is full disk compatibility, you need not throw out your existing programs or files.

But the beauty of STAR-DOS becomes obvious to the serious user. From the programmer's viewpoint, STAR-DOS is just like other standard 6809 Disk Operating Systems. It provides all the standard features you need, such as provisions for multiple 320-byte file control blocks, routines to open, read, write, and close named files, rename or delete files, read or write single sectors, search or modify the directory, and more. STAR-DOS is so powerful that many programs written for other 6809 systems can be run with STAR-DOS just by changing a few addresses.

STAR-DOS is supplied on a disk with a comprehensive user and programmer's manual, which explains all available routines and entry points, along with examples showing how to use them. The manual explains how to convert programs running under another DOS to run with STAR-DOS. It also comes with a number of utilities to make use of your disk system even easier and faster. It costs just \$49.90 and is available NOW.

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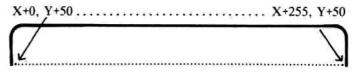
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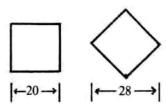
*Machine Language.

**Machine Language Subroutines.

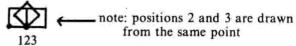
right, or from right to left. I have chosen a left to right roll, but you might want to roll from right to left. In this first version of the program, let's use a constant Y value of 50. We have these limits for X.



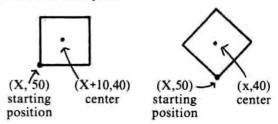
Also keep in mind that we are using a square that is 20 units wide.



We'll start the die at X=30 and move the die 20 units across the screen in each move. The first three positions would look like this.



Since we said the die would be faceless, we'll use the PAINT statement to make it so. We'll paint from the "center" of the square. The statement varies according to the position of the square.



Also remember to clear the screen before each drawing. This will erase the previously drawn square.

At last, I think we are ready to write the program. Our first attempt looks like this.

Die Roll

1

ı

1

100 GOTO 270 ← go clear pages

110 PMODE 4,1: PCLS ← ready pages 1-4

120 DRAW "BM30,50; U20R20D20L20" ← DRAW on pages 1-4

130 PAINT (40,40),1,1

140 FOR X+50 TO 220 STEP 20

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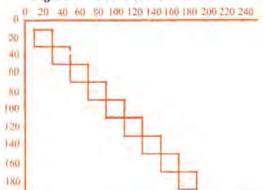
- 150 SCREEN 1,0 ← display pages 1-4
- PMODE 4,5: PCLS ← ready pages 5-8 160
- X\$+STR\$ (X) ← make a string for DRAW 170
- 180 DRAW "BM" = X\$=",50; H14E14F14G14 DRAW on 5-8
- 190 PAINT (X,40), 1.1
- 200 SCREEN 1,0 ← display pages 5-8
- PMODE 4,1: PCLS← ready pages 1-4 210
- 220 DRAW "BM" = X\$=",50; U20R20D20L20" DRAW on 1-4
- 230 PAINT (X=10,40), I,I,
- 240 NEXT X ← move it across the screen 250 GOTO 110 ← do it again
- 260 END
- 270 PCLEAR 8: CLEAR 50: GOTO 110 ←—clear pages and string space

Angular Motion

Instead of moving the die in a purely horizontal movement, let's see what we have to do to move it to the right and downward. To think this one through, I have to get back to my drawing board.

Position I looks like the easiest so I laid out the pattern of moves shown in Figure 2. I'll call these the odd positions since they are in positions 1, 3, 5, etc.

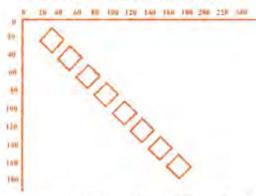
Figure 2-Odd Positions of the Die



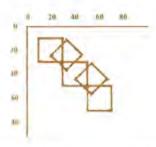
The die will rotate while moving to the right and downward for position 2, 4, 6, etc. Figure 3 shows the even positions of the die.



Figure 3-Even Positions of the Die



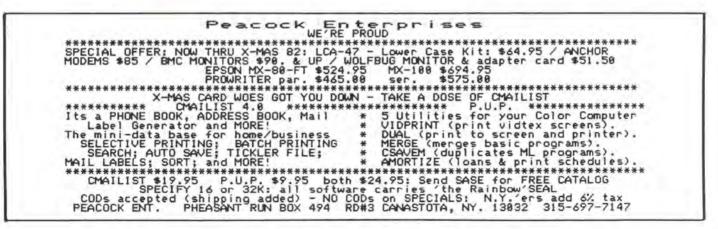
When you put the first positions of Figure 2 and Figure 3 together, you get something like this:



Notice that successive positions of the die are uniform in the X direction. This was done for convenience so that the FOR-NEXT loop would conform to that in our first program. Also notice that a regular pattern was used for the movement in the Y direction. The motion in two directions combined with the rotation creates a crude simulation of the die tumbling through space. The resulting program is very similar to the rolling die program. I've moved the starting point closer to the upper left corner of the screen to allow for more movement.

Tumbling Die

- 100 GOTO 500
- 110 PMODE 4, 1: PCLS
- 120 DRAW "BM10 10: R20D20L20U20"
- 130 PAINT (20,20), 1,1
- -Y set for next DRAW 140 Y=20 ←
- 150 FOR X=20 TO 160 STEP 20
- 160 SCREEN 1.0
- PMODE 4,5: PCLS 170
- 180 X\$=STR\$ (X): Y\$=STR\$ (Y+4)
- DRAW "BM" +X\$+ "," +Y\$+ "E14F14G14H14"



- 200 PAINT (X+10,Y), 1, 1,
- 210 SCREEN 1.0
- 220 Y = Y + 10-move down
- 230 PMODE 4, 1: PCLS
- 240 X\$=STR\$(X+10): Y\$=STR\$(Y) \leftarrow move right
- 250 DRAW "BM" +X\$+ "," =Y\$= "R20D20L20U20"
- 260 PAINT (X=20, Y=10), 1,1
- 270 Y=Y+10 ← —move down again
- 280 NEXT X
- 290 GOTO 110
- 300 END
- 500 PCLEAR 8: CLEAR 50: GOTO 110

Adding More Realism

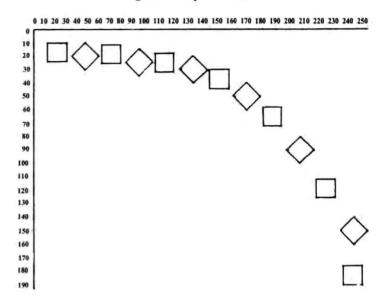
Everyone knows that objects do not fall through space in a straight line as in the previous program. Consider our die being propelled in a horizontal direction by some initial force. Other forces will also act on the die. Gravity will tend to pull the die downward. Friction from the atmosphere will also effect the movement. We won't present a mathematical analysis of the forces, but they act in the following general way.

initial force air friction gravity

The resulting path of the die is shown in the graphic sketch

of Figure 4. Once again, we'll have the die rotate as it moves through space.

Figure 4-Space Travel



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SPACE TRAVEL 100 GOTO 350 110 FOR N+1 TO 6 120 READ XS,YS ← -origin for odd positions 130 PMODE 4,1: PCLS 140 X+VAL (X\$): Y+VAL (Y\$) ←we need strings and numbers 150 DRAW "BM" =X\$= "," =Y\$= "R14D14L14U14" 160 PAINT (X=7,Y=7), 1,1 smaller square 170 SCREEN 1,0 180 READ X\$, Y\$ ← - origin for even positions 190 PMODE 4,5: PCLS 200 X+VAL(X\$): Y+VAL(Y\$) 210 DRAW "BM" =X\$= "," =Y\$= "E10F10G10H10" 220 PAINT (X=7, Y), 1,1 230 SCREEN 1,0 240 NEXT N 250 PMODE 4,1: PCLS — one more position 260 DRAW "BM230,176; R14D14L14U14" 270 PAINT (237, 180), 1,1, 280 SCREEN 1,0 290 FOR W+1 TO 200: NEXT W -wait a bit 300 RESTORE: GOTO 110←restore data and repeat 310 END

That's it for now. Coming Next Month—Using PUT and GET.



Listing I

320 DATA 10, 10, 28, 20, 50, 12, 68, 25 330 DATA 90, 18, 108, 30, 130, 30, 148, 50

340 DATA 170, 58, 188, 90, 210, 112, 228, 150 350 PCLEAR 8: CLEAR 50: GOTO 110

```
100 GOTO 270
110 PMODE 4,1:PCLS
120 DRAW"BM30,50; U20R20D20L20"
13Ø PAINT (4Ø, 4Ø), 1, 1
14Ø FOR X=5Ø TO 22Ø STEP2Ø
15Ø SCREEN 1,Ø
160 PMODE 4,5: PCLS
17Ø X$=STR$(X)
18Ø DRAW"BM"+X$+",50;H14E14F14G1
19Ø PAINT(X,4Ø),1,1
200 SCREEN 1.0
210 PMODE 4,1: PCLS
22Ø DRAW"BM"+X$+",50;U2ØR2ØD2ØL2
23Ø PAINT(X+1Ø,4Ø),1,1
24Ø NEXT X
25Ø GOTO 11Ø
26Ø END
```

27Ø PCLEAR8: CLEAR 5Ø: GOTO 11Ø



Listing 2

100	GOTO 27Ø
110	PMODE 4,1:PCLS
120	DRAW"BM3Ø, 5Ø; U2ØR2ØD2ØL2Ø"
	PAINT (40, 40), 1, 1
140	FOR X=5Ø TO 22Ø STEP2Ø
	SCREEN 1.0
160	PMODE 4,5: PCLS
170	X\$=STR\$(X)
180	DRAW"BM"+X\$+",50;H14E14F14G1
4"	
199	PAINT (X, 4Ø), 1, 1
200	SCREEN 1,0
210	PMODE 4,1: PCLS
220	DRAW"BM"+X\$+",50;U20R20D20L2
ø"	
230	PAINT (X+10,40),1,1
	NEXT X
250	GOTO 11Ø
260	END

27Ø PCLEAR8: CLEAR 50: GOTO 110



Listing 3

100	GOTO 500
110	PMODE 4,1: PCLS
120	DRAW"BM10, 10; R20D20L20U20"
130	PAINT (20, 20), 1, 1
	Y=20
150	FOR X=20 TO 160 STEP 20
160	SCREEN 1,0
	PMODE 4,5: PCLS
	X\$=STR\$(X): Y\$=STR\$(Y+4)
190	DRAW"BM"+X\$+","+Y\$+"E14F14G1
4H1	4"
	PAINT(X+10,Y),1,1
	SCREEN 1,0
	Y=Y+1Ø
	PMODE 4,1: PCLS
3000	X\$=STR\$(X+1Ø): Y\$=STR\$(Y)
	DRAW"BM"+X\$+","+Y\$+"R2ØD2ØL2
ØU29	구멍하는 경기에 가장하는 것이 집에 가는 그 그렇지 않는 것이 되었다. 그는 그를 가장하는 것이 없었다는 것이 없었다.
	PAINT(X+2Ø, Y+1Ø),1,1
270	Y=Y+1Ø
	NEXT X
290	GOTO 11Ø
	END
500	PCLEAR 8:CLEAR 50: GOTO 110

Software Review ...

Intergalactic Force Thrills "Dr. Doom"



"Dr. Doom" is what we call him around these parts. He's one of those types who subscribes to Soldier of Fortune Magazine, has a gun for every purpose and knows seventeen ways to kill you before you can even call for help. We count ourselves fortunate that Dr. Doom is a friend; we don't need enemies of his caliber or guage.

When we were introduced to Intergalactic Force, a graphics space battle game by C.J. Roslund, we thought immediately of Dr. Doom, for if you had to pilot an X-Wing fighter ship into a channel, fending off Imperial fighters and avoiding the Laser beam, all the while, as you maneuvered to drop a photon bomb into the ventilation shaft opening on the Death-Star, Dr. Doom is the man to do it. Now, Dr. Doom isn't any video avenger of great renown, but he did just purchase a TDP-100 home computer, and he does have a long-standing taste for the kill. Besides, keeping Dr. Doom indoors and occupied with Intergalactic Force would make the streets safer for everyone else.

It takes about a minute to load *Intergalactic Force*. When the title page appears, an organ music rendition of a very familiar tune plays a few moments to whet your appetite. A hint of a smile—or is it a grimace—crosses Dr. Doom's face as we listen to the very well done musical prelude. Perhpas it isn't a smile; it's hard to read someone's fact with only the light of the video screen reflecting off his mirror sunglasses.

With a joystick in one hand, Dr. Doom strokes his saltand-pepper beard with the other—he's even taken off his gloves by the time the screen action begins. Dr. Doom is ready to deal video death!

Die! Die! Die! Die! Die! And then, it's over. The Force: 6, Dr. Doom: 0. The Merchant of Menace mutters and then goes back into action. This time he draws blood and is rewarded with a satisfying "Phhhulll" as he blows an Imperial fighter to smithereens. But before he can lick his chops, he's shot down twice in a row. Then, in a Kamikaze attack, he succeeds in ramming the Imperial fighter and demolishing both ships; the TV monitor audio produces a sort of a fizzle which causes Dr. Doom to wrinkle his nose in disgust; the fizzle sound is hardly the way to die with glory. Pausing to light up a Lucky, Dr. Doom heads back to the battle.

Intergalectic Force is in machine language, and the graphics do give you the feeling of movement. Dr. Doom complained that he couldn't "shoot up" at the Imperial

fighters and "lay some bombs" on the ventilation shaft all in the same moment, but that shouldn't be much of a drawback for most of us who'll be busy enough just staying out of the way of the laser beam.

While Intergalectic Force keeps a running score, notes how many ships you have left and has a bar-graph guage to remind you how many photon bombs you have left (you can fly off and reload when you're low), a feature that I found added a nice touch was a constant background noise that sounds like an engine room, sort of what you might expect the sound of a space vehicle to be making as it zooms through the void.

There are three levels of difficulty, and the going really gets tough on Level III when the Imperial fighters not only shoot faster at you, but deftly dodge your bursts of fire. We found the action to be highly responsive to the joystick—no play in the steering as is sometimes encountered in graphics games—and we found nothing really to criticize. While Dr. Doom's personal endorsement is unprintable in a family magazine such as the Rainbow, we noticed he was smiling at us as he put our cassette into the thigh-level pocket of his leathers and headed for his "hog." It's always a pleasure to have Dr. Doom visit and leave smiling. No broken furniture is an endorsement we've come to appreciate. In our view, Intergalectic Force is with it.

(Anteco Software, 4220 Clay Avenue, Ft. Worth, TX 76117, \$24.95.)

- Jim Reed

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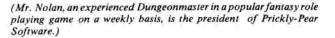


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Pressed for Time? Paint a Dungeon!

By Bill Nolan Rainbow Contributing Editor







I his month I will tell you how to use the graphics ability of the 80C to speed up the actual play of a fantasy game. One facet common to all of these games is the exploration of some ruin or underground dungeon complex by the players, and a great deal of time is spent by the referee in describing these rooms to the players as they enter them.

Even if the room is small and simple, it still takes times to describe it properly. For example, suppose that the group of players had been proceeding north up a corridor when the corridor ended in a door. They succeed in entering the door, and go north into a room. As referee you then have to say "you have just entered a room which is 30 feet from east to west, and 60 feet from north to south. The door by which you entered is in the middle of the south wall, and seems to be the only door in the room." Even this simple description will take a lot of time away from play when you multiply it by the 50 or 100 rooms in the average dungeon, and that was the most simple room possible to describe. It was a box with only one door and nothing of special note inside. Besides, how did the players know it was exactly 30' by 60'? Did they get out a tape and measure it? I hate to give away information which the players might not necessarily know.

In real life, if you walk into a room you can estimate the size, but you won't know it exactly, and neither would your fantasy characters. Since they are trying to estimate by torch or lantern light it will be even harder for them. On the other hand, you can't really say "you just entered a room, but I can't tell you how big it is." And remember, that was a very simple room!

What if you have a lot of complex rooms, like this next one? "You have just entered a large room, via a door in the south wall. The door you entered is about 10' from the west wall. The west wall goes north for 60' and then turns to the east. It goes east for 30', with a door in the middle of that section, and then turns south. It goes south 10', and then east again for 20', where it turns north. The wall goes north 40', with a door right in the middle of that section, and then turns east again. It goes east 50' with two doors in that section equally spaced, and then turns south. After going south for 90', it turns back west and goes 80' to rejoin the door you entered. There are three deep pools of water in this room, each 30' in diameter, and they are located in the southwest, southeast, and northeast sections of the room.

That took a while to describe, and you probably still don't really know what that room looks like. I finally got tired of wasting all this time and wrote a program, which you can expand upon fairly easily. The program uses DRAW, CIRCLE, and PAINT statements to make a map of the room on the PMODE 3 screen. Then, all you have to do is select the room by its number, and there it is, right on the screen! Believe me, this will save you time, and you can save even more if you make a good map of each of the rooms on white paper and trace them to make a dungeon map. You will really be amazed at how many different dungeons you can make by reusing the same rooms in different ways.

I gave you a start with 19 rooms in the program below, and you will be able to fit more in easily. With 16K, you can have about 100 in memory, and a lot more with 32K. You

will find that 100 will be enough for literally thousands of different dungeons. By the way, both of the rooms described above are among the 19 I have given you.

Now, let's see how the program works. Line 5 defines four strings—U\$, R\$, D\$, and L\$. Each of these strings is the DRAW statement for a standard dungeon door 10' wide, and each is used when your DRAW line is moving in a different direction—up, right, down, and left. Each replaces a 10' section of wall. Thus, if you want to draw a 30' section of north/south wall starting from the bottom, and with a door right in the middle, it would look like this: "U10XU\$;U10". When used in a DRAW statement, this would draw up 10, exit to the up door string, which uses 10, and then draw up 10 more. If you compare the DRAW statements in the program below with the rooms they draw, you will get the idea pretty quickly.

Line 6 clears the screen to blue, and asks you for a room number. There are 19 rooms in the program I have given you, so it asks for a number from 01 to 19. If you add more rooms, you will have to change the "19" to the number of rooms in your program. Line 7 gets a single character from the keyboard using the INKEY\$ statement, and stores it in K\$. Line 8 gets another character from the keyboard and stores it in KK\$. The second part of line 8 then concantenates K\$ and KK\$. Remember, if we have two NUMBERS, 1 and 2, and we add them together, we will get a NUMBER 3. However, if we have two STRINGS, 1 and 2, and we concantenate them, we will get a STRING "12". Both operations use the plus sign.

Line 9 uses the VAL function to turn the STRING K\$ into a NUMBER, K. It then goes on to check the number to make sure it is a number from 1 to 19 (because that's how many rooms there are). If it finds that K is less than 1 or greater than 19, it sends the program back to line 6 to get different characters. If you key in letters instead of numbers, the VAL function will return a 0. If the number K is found to be in the correct range, line 9 then does a GOSUB to line 12, where the PMODE 3 screen is set up and cleared. When this RETURNs, the program goes on to line 10, which uses the ON GOSUB statement to send the computer to the line indicated by the room you have selected. When it gets to the room line, it DRAWs and PAINTs the room and then goes to 13, which makes it wait until you press any key (except BREAK). When you press a key, the computer does a RETURN. Remember, we did a GOSUB from line 10, so that's where it returns. At the end of line 10 is a GOTO 6, which sends it back to line 6 to start over again.

If you add additional rooms, you will have to change the 19 in line 6, which I mentioned above. You will also have to change the 19 in line 9, and add additional line numbers to line 10. If you run out of space on line 10, (about 50 rooms) you will have to put the additional numbers (and another GOTO 6) on a new line, number 11. You will also have to put some logic at the end of line 9 to test K. Suppose you have 50 line numbers on line 10. At the end of line 9 you would insert: IF K is greater than 50 THEN K=K-50:GOTO 11. If you have more or fewer than 50 line numbers in line 10 you would have to substitute the actual number for the number



MACRO-80C

The Micro Works is pleased to announce the release of its disk-based editor, macro assembler and monitor, written for Color Computer by Andy Phelps. THIS IS IT — The ultimate programming tool!

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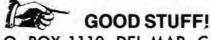
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50 in both places in the example above. Line 11 would be just like line 10 except for the line numbers following the ON K GOSUB.

The SOUND statements in lines 7, 8, and 13 are there to give you a key beep, so you will know for sure when you have pressed a key. Because of the method used to get the numbers, room numbers lower than 10 will have to be put in with a 0 in front of them (03, 06, 04, etc.).

When you use this program, your players will not have to be told room sizes. They will be able to estimate, just like real life, because the rooms are to scale, and the doors are known to take up 10' of wall space. This way, there is no need to give away information. If the players want to know exactly how large a room really is, let them buy a measure and take the time to use it! By the way, because the pixels on the color computer screen are not exactly square, a square room will appear on the screen to be slightly higher than wide. If that causes any estimating problems, attribute it to the poor light.

Well, that about covers this program. If you have any questions, write to me at Prickly-Pear Software, and meanwhile, I want to wish all of you a very wonderful and safe holiday season. May all your Dragons have a bow on them!

The listing: 5 U\$="L1U1ØR3D1ØL2BU1Ø":R\$="U1R1 ØD3L1ØU2BR1Ø": D\$="L1D1ØR3U1ØL2BD 10":L\$="D2L1@U3R1@D1BL1@" 6 CLS3:PRINT@98, "KEY THE DESIRED ROOM NUMBER";:PRINT@13Ø,"(FROM 'Ø1' TO '19')";:PRINT@194,"PRICK LY-PEAR SOFTWARE";: K\$=INKEY\$ 7 K\$=INKEY\$:IF K\$="" THEN GOTO7 ELSE SOUND150,1 8 KK\$=INKEY\$: IF KK\$="" THEN GOTO 8 ELSE K\$=K\$+KK\$: SOUND15Ø,1 9 K=VAL(K\$): IF K<1 OR K>19 THEN 6 ELSE GOSUB12 1Ø ON K GOSUB14, 15, 16, 17, 18, 19, 2 0,21,22,23,24,25,26,27,28,29,30, 32,33:GOTO6 12 PMODE3, 1: PCLS: SCREEN1, Ø: COLOR 6.5: RETURN 13 K\$=INKEY\$: IF K\$="" THEN13 ELS E SOUND15Ø, 1: RETURN 14 DRAW"BM128,96U6ØR3ØD6ØL1ØXL\$; L10":PAINT(130,90),7,6:GOTO13 15 DRAW"BM128,96U15XU\$;U15R3ØD4Ø L3Ø":PAINT(13Ø,9Ø),7,6:GOTO13 16 DRAW"BM60,120U21NR10C8U2R10D3 C6R1ØNR2ØU5ØR6ØD5ØL2ØD2ØL6Ø":CIR CLE (95, 67), 8: CIRCLE (125, 87), 8: PA INT (62, 118), 8, 6: PAINT (95, 67), 7, 6 :PAINT (125, 87), 7, 6: GOTO13 17 DRAW"BM6Ø, 1ØØU9ØR3ØXR\$; XR\$; R7 ØD9ØL12Ø":CIRCLE(13Ø,6Ø),35:PAIN T(62,98),8,6:PAINT(130,60),7,6:G **OTO13** 18 DRAW"BM128,96D1ØL1ØNU1ØL4NU1Ø L4NU1ØL4NU1ØL4NU1ØL4U1ØNR2ØU1ØR1

ØU2ØXR\$; D2ØBL1ØXR\$; R1ØD1ØXL\$; ": G

19 DRAW"BM60, 100U10NU30R10U30L10

OT013

U1@R4@ND5@R5ND5@R5ND5@R5ND 5@R5ND5@R5ND5@R12@D2@XD\$; D2@L55X L\$; L25XL\$; XL\$; L8Ø": PAINT (62, 98), 7.6: PAINT (62,80),8,6: PAINT (160,6 2),7,6:GOTO13 2Ø DRAW"BM128,96U2ØXU\$;U2ØR5ØD5Ø L2ØXL\$; L2Ø": PAINT (13Ø, 9Ø), 8, 6: GO T013 21 DRAW"BM60,140U10XU\$;U10R50U60 R8ØD1ØXD\$; D1ØL5ØD6ØL8Ø": PAINT (65 , 135) , 7, 6: GOTO13 22 DRAW"BM128,96U7ØR25XR\$;R25D7Ø L25XL\$; L25": PAINT (130, 90), 7, 6: GO T013 23 DRAW"BM13Ø.12ØU25XU\$; XU\$; U25G 36F35":PAINT (128, 116), 8, 6:GOTO13 24 DRAW"BM128,96U1ØXU\$;U1ØR1ØXR\$;R1ØD1ØXD\$;D1ØL1ØXL\$;L1Ø":PAINT(135,92),7,6:GOTO13 25 DRAW"BM128,96U2ØXU\$;U2ØR1ØXR\$;R1ØXR\$;R1ØD39XD\$;XD\$;D4ØL8ØXL\$; L1ØU6ØR1ØXR\$;R1ØD1ØR2Ø":CIRCLE(1 53,121),15:CIRCLE(153,71),15:CIR CLE (103, 121), 15: PAINT (135, 90), 8, 6:PAINT(153, 121), 7, 6:PAINT(153, 7 1),7,6:PAINT(103,121),7,6:GOT013 26 CIRCLE (128, 96), 30: DRAW"BM123, 125XR\$; ": PAINT (128, 96), 7, 6: GOTO1 27 CIRCLE(128,96),25:CIRCLE(128, 96),50:DRAW"BM123,145XR\$;":PAINT (128, 96), 7, 6: PAINT (128, 140), 8, 6: GOTO13 28 DRAW"BM8Ø, 11@U1@XU\$; U1@E3@R1@ XR\$;R1@F3@D1@XD\$;D1@G3@L1@XL\$;L1 ØH3Ø":PAINT(128,96),7,6:GOTO13 29 DRAW"BM128,140H30U10XU\$;U10E3 ØF3ØD1ØXD\$; D1ØG3Ø": PAINT(128, 96) .8.6:GOTO13 3Ø DRAW"BM5Ø,18ØU2ØNR16ØU2ØNR16Ø U2ØNR16ØU2ØNR16ØU2ØNR16ØU2ØNR16Ø U2ØNR16ØU2ØR2ØND16ØR2ØND16ØR2ØND 16@R1@XR\$; ND16@XR\$; R1@ND16@R2@ND 16ØR2ØND16ØR2ØD16ØL7ØXL\$; XL\$; L7Ø ":FOR X=60T0180STEP40:FOR Y=30T0 15ØSTEP4Ø:PAINT(X,Y),8,6:NEXT Y: NEXT X 31 FOR X=8ØTO2ØØSTEP4Ø:FOR Y=5ØT D17ØSTEP4Ø: PAINT (X,Y), 8,6: NEXT Y :NEXT X:FOR X=60T0180STEP40:FORY =50TD170STEP40:PAINT(X,Y),7,6:NE XT Y:NEXT X:FOR X=80T0200STEP40: FOR Y=3ØT015ØSTEP4Ø:PAINT(X,Y),7 ,6:NEXT Y:NEXT X:GOTO13 32 DRAW"BM70,120E40R60F40L60XL\$; XL\$; L6Ø": PAINT (128, 96), 8, 6: GOTO1 33 CIRCLE(128,96),70,6,.5:DRAW"B M123,60XR\$; ": PAINT (128,96),7,6:G OT013

Software Review ...

Fine Graphs Are Easy With The Graph Zapper

We suppose the biggest disappointment with the VisiCalc program is its total inability to do graphs, except by the most simple means—using asterisks in a line. Yet, graphs can depict trends like almost nothing else.

But, darn it, constructing graphs freehand on CoCo (or any other computer graphic screen) are difficult. You need to position levels, label lines, figure out the hatch marks and so on and that takes a lot of time and trouble. When, we asked, will someone come up with a good general-purpose

graph program.

Well, someone has. Graph Zapper has a whole lot of options and the like, but the bottom line is that it will create fine, nay, excellent graphs easily and quickly. You have the advantage of concentrating on the data you are inputting into the graph rather than on drawing the graph itself.

This program allows you to either plot points or connect them (and with different kinds of lines, too), to title the graph, to label the two axes and to decide how many "hatch marks" should be on each axis. In addition, you can determine whether you wish the graph to be just plain (as most are), whether you wish to have dots at the intersecting points of the hatchmarks or whether you want a whole grid. These latter options can be turned off and on quickly. And, with a screen print program (not supplied with this package), you can print your graphs out on paper.

Graph Zapper allows you to load graphs from tape or disk, or to load graph formats and then simply change the data. And, most powerful of all, it allows you to input data

to the graph in either of two ways.

Using method one, you just simply load in the data you wish to have at any given point. This is pretty simple

(although an editing feature is provided to change any or all elements as you wish). This is excellent for those quick-anddirty graphs you want to see. You can have a sophisticated looking graph in a couple of minutes.

Method two uses equations. Excellent for generating data from a set of given circumstances. Say, for instance, you wanted to show what sort of dollar volume you might expect from a business that would grow at the rate of 10 percent a month over a year's period. That is a simple equation to write, and you can use it to generate a series of points on a graph with no trouble at all.

Graph Zapper is one of the most completely documented pieces of software we have seen. The tape version has 19

pages-the disk version two more.

The primary difference between the cassette (16K) version and the disk (32K) is the use of a menu to load previously-created disk graphs. The 32K version will work with cassette and provides, obviously, more space to store data points.

Graph Zapper is an outstanding utility and can be a major tool in statistical, business and other uses where graphic

representation of numbers is desirable.

(Southern Software Systems, 485 Tropical Trail-Suite 109, Merritt Island, FL 32952, \$15.95 for 16K tape, \$19.95 for 32K disk plus \$1 s/h)

Hint . . .

Painting Must Be Accurate

When you issue a PAINT command, be sure that you set the point at which the PAINTing is to begin within the area that is to be PAINTed. If you set the position on a line which encloses the area, the PAINT will not work.

Also, when using PAINT, be sure that your area is fully enclosed, or the PAINT will leak out and cover the entire

screen.

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Memory Exam:

Where Does it Start?

By Lester Hands

MEM EXAM is a machine language program that helps you rapidly examine memory and determine the address of items of interest. For example, if you have a disk system, the graphics pages are allocated dynamically. After running a special high-res design program that took several hours to create, you decide to save the screen as a machine code file. The only problem is, where does the display page start? With this program, that is a simple question to answer.

If you have an editor-assembler, use listing 1 to enter the program. Note that it is written in position-independent code. For this reason it may be placed at any location in memory. Line 360 should be changed to "RTS" if you wish to access this program from Basic. The

entry point is at "START."

Listing 2 allows you to enter the program via a Basic program. First, CLEAR100, 3805 for a 4K system, or CLEAR100, 16093 for 16K. Enter the program. After running it, you will get an out of data error message. Ignore this and type "EXEC" followed by the starting address: 3805 for 4K, or 16093 for 16K systems.

Upon entry, the program will display the title "MEM EXAM/PRESS ANY KEY." After a key is pressed, this screen will immediately display \$600-\$800 in the alphanumerics mode. What the program does is to transfer that block of memory to the standard display page at \$400-\$600. Pressing the up or down arrow keys decrements or increments th display page. When you see the data that you want to determine the address of, press either the right or left arrow key. A blinking cursor will appear, which can be manipulated in any direction with the arrow keys. When the cursor is over the byte you want, press the "break" key and the address of that byte will appear at the bottom of the screen in a hex format. Press any key now, and the screen will readjust so that the marked byte is now at the left upper corner. You are back in the page mode, where the up and down arrow keys can be used. If the "break" key is pressed in this mode, the program will return you to Basic (or your monitor if line 360 of listing 1 is

The comments of listing I should help you understand how the program works. Probably the most interesting part is the hexto-ASCII conversion routine starting at line 810.

Happy sleuthing!



00100		ASSEMBLY LANGUE	
	Commence of the last	OF "MEM E	
			OU TO EXAMINE MEMORY BY DISPLAYING
			RSOR MAY BE MANIPULATED AND THEN TH
		98 OF THE CURSOR	
	START		LOAD X WITH THE TITLE LINE ADDRES
00170		BSR PRINTT	
00180		BRA BEGDIS	
00190	PRINTT	LDA , X+	
00200	Street		LINE FINISHED IF DATUM-O
00210			OUTPUT CHARACTER TO SCREEN
00220		BRA PRINTT	GOTT OF STREET, TO SUITELLY
00230		JSR [\$0A000]	MATT INITIL A MEN TO DECORED
00240			WAIT UNTIL A KEY IS PRESSED
00250		TSTA	
		BEQ WAIT	
00260		RTS	No. of the factors of the contract of the cont
	BEGDIS		X IS THE MEMORY POINTER
	DISPLA		U IS THE DISPLAY PAGE POINTER
00290	DISPLI	LDD ,X++	DISPLAY A PAGE OF MEMORY
00300		STD ,U++	
00310		CMPU #95FE	
00320		BLE DISPLI	
00330	CHND	BSR WAIT	COMMAND MODE: GET COMMAND CODE
00340	CI II4D	CMPA #3	BREAK?
			BREAK?
00350		BNE DECPAG	
00390	Tour As	SWI	RETURN TO BASIC
00370	DECPAG	CMPA ##5E	UP?
00380		BNE INCPAG	
00390		LEAX SFCOO, X	DECREMENT X BY 400
00400		BRA DISPLA	
	INCPAG	CMPA #SOA	DOWN?
00420	11101 110	BNE CURSON	DOM:
00430		BRA DISPLA	2 5 5 6
	CURSON	CMPA #8	LEFT?
00450		BEQ MOYCUR	
00460		CMPA #9	RIGHT?
00470		BNE CHND	
004B0	MOVEUR		U BECOMES THE CURSOR POINTER
	MOVCR1	LBSR CURSOR	BLINK CURSOR UNTIL KEY PRESSED
00500		JSR [\$0A000]	DETING DOMBON DIVITE KET THEODED
00510			
		TSTA	
00520	1222	BEQ MOVER1	THE RESERVE AND AND THE PARTY OF THE
00530		CMPA #8	MOVE CURSOR TO THE LEFT
00540		BNE RIGHT	
00550		LEAU -1,U	
00560		CMPU ##400	
00570		BGE MOVER1	
00580		LDU #\$400	CURSOR OFF PAGE: PUT BACK ON
00590			CONSON OFF PHOE; PUT BACK ON
	-	BRA MOVCR1	
00600	KIGHI	CMPA #9	MOVE CURSOR RIGHT
00610		BNE UP	
00620		LEAU 1,U	
00630		CMPU ##5FF	
00640		BLE MOVCR1	
00650		LDU WSSFF	CURSOR OFF THE PAGE; PUT BACK ON
00660		BRA MOVER1	CONSON OF THE PAGE FOI BACK ON
00670	(an	CMPA #55E	tonine dimensions
			MOVE CURSOR UP
00980		BNE DOWN	
00690		LEAU SFFEO, U	
00700		CMD() #4400	
00700		CMPU #\$400	
00710		BOE MOVER1	
00720		LEAU \$20,U	CURSOR OFF PAGE; PUT BACK ON
00730		BRA MOVERI	
00740	DOWN	CMPA #SOA	MOVE CURSOR DOWM
00750		DNE BREAK	
00760		LEAU #20,U	
00770		CHPU WASFF	
007B0		BLE MOVER1	
00790		And the second s	CURRENT OFF BACE, DUE NAME OF
		LEAU OFFEO, U	CURSOR OFF PAGE; PUT BACK ON
00800		BRA MOVER1	

00810	BREAK	CHPA #3
00820		BNE RESTAR
00830		LEAX SFACO, X
00840		TFR U, D
00050		LEAX D.X
00860		LDA #SOD
00870		JBR [\$0A002]
00880		STX SO
00890		LDA SO
00900		LSRA
00910		LSRA
00920		LSRA
00930		LBRA
00940		BSR HEXPRT
00950		LDA SO
00960		ANDA #SOF
00970		BSR HEXPRT
00980		LDA 91
00990		LSRA
01000		LSRA
01020		LSRA
01030		BSR HEXPRT
01040		LDA \$1
01050		ANDA SSOF
01060		BSR HEXPRT
01070		LBSR WAIT
01080		LBRA DISPLA
	HEXPRT	ADDA 9890
01100	1 man 14.1	DAA
01110		ADCA #840
01120		DAA
01130		JSR [\$0A002]
01140		RTS
	RESTAR	CMPA ##3F
01160		LBNE MOVERS
01170		LBRA START
	CURSOR	
01190		LDA ,U
01200		PSHS A
01210		EDRA #SOFF
01220		STA ,U
01230		LDX 00400
01240	PAUSE	LEAX -1, X
01250		BNE PAUSE
01260		PULS A
01270		STA ,U
01280		TDX 00200
01290	PAUS1	LEAX -1, X
01300		BNE PAUSI
01310		PULS X
01320		RTS

BREAK: DISPLAY CURSOR ADDRESS

RESET X TO START OF CURRENT DISPLAY PAGE.
INCREMENT X BY U SO THAT
X POINTS TO THE CURSOR POSITION
LINE RETURN

SAVE X AT SO PRINT THE MSB OF FIRST BYTE

PRINT LSB OF FIRST BYTE

PRINT MSB OF 2ND BYTE

PRINT LSB OF 2ND BYTE

CONVERT HEX NUMBER IN A TO ASCII

PRINT ASCII NUMBER

KEY=?

DISPLAY CURSOR

ERASE CURSOR

10 DATA 48, 141, 1, 1, 141, 2, 3 2, 18, 166, 128, 39, 6, 173, 159 160. 20 DATA 32, 246, 173, 159, 160, 0, 77, 39, 249, 57, 142, 6, 0, 2 96, 4, 3Ø DATA 236, 129, 237, 193, 17, 131, 5, 254, 47, 246, 141, 230, 129, 3, 38, 1 40 DATA 57, 129, 94, 38, 6, 48, 137, 252, 0, 32, 226, 129, 10, 3 50 DATA 220, 129, 8, 39, 4, 129, 9, 38, 225, 206, 5, 16, 23, 0, 151, 173 60 DATA 159, 160, 0, 77, 39, 246, 129, 8, 38, 13, 51, 95, 17, 13 70 DATA 44, 234, 206, 4, 8, 32, 229, 129, 9, 38, 13, 51, 65, 17, 131. 5 80 DATA 255, 47, 217, 206, 5, 25 5, 32, 212, 129, 94, 38, 14, 51, 200, 224, 17 90 DATA 131, 4, 0, 44, 199, 51, 200, 32, 32, 194, 129, 10, 38, 1 4, 51, 200 100 DATA 32, 17, 131, 5, 255, 47, 181, 51, 200, 224, 32, 176, 12 , 3, 38, 61 110 DATA 48, 137, 250, 0, 31, 48 48, 139, 134, 13, 173, 159, 16 Ø, 2, 159, Ø 120 DATA 150, 0, 68, 68, 68, 68, 141, 26, 150, 0, 132, 15, 141, 26, 156, 1 130 DATA 68, 68, 68, 68, 141, 12 , 150, 1, 132, 15, 141, 6, 23, 2





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Education Notes...



Sustain Children's Interest By Expanding Relevance

By Steve Blyn Rainbow Contributing Editor

(Mr. Blyn, who teaches both exceptional and gifted children, holds two Master's degrees in the field of education and has won an award for the design of a computer program to aid handicapped children. He and his wife, Cheryl, own Computer Island.)

There will most likely come a time in most childrens' experiences when they look at their home or classroom computer and finally say "what can I do with it besides play

games or learning programs?

This can be either a bad or a wonderful time for the child and the adult to whom this question is addressed. Too often, children's initial interest in computers is soon lost because they do not see its relevance to themselves. Games usually can sustain interest for a limited amount of time. Both adults and children soon learn to expect the computer to begin to do things for them. If the adult cannot motivate and show the child some practical uses of the computer, then we run the risk that the child's interest will want.

This would be the perfect opportunity to show how the computer can do some meaningful work for the child. Every kid has hobbies and collections. Children collect all sorts of objects. Examples are rocks, stamps, bugs, coins, their tests, their schoolwork, pictures, records and, of course, computer tapes. Any of these can be organized by the child on any of the CoCo computers. Catalogs, records of collections, or happenings relevant to the child can be a way of interesting him/her in data processing. The child can learn to do simple manipulations of the data to locate or categorize parts of the whole list. This can be a fascinating learning experience for anyone. Of course, the addition of output to a line printer would greatly add to the excitement.

Although my sons pressured me to produce a baseball card data program, I have chosen to keep the column in an educational realm and will illustrate a book report's program. This program would be suitable for an individual's, or an entire class's, record of book reports. The reports can be grouped by title, author and any other additional categories. My students have always been encouraged to rate the books that they have read. That way, other children will know beforehand whether their peers liked or disliked a particular book. The information input, therefore, will be TITLE, AUTHOR, and RATING for

each book.

The three types of information will be contained on DATA lines. Each book gets one DATA line including all the information separated by commas. Line 60 tells the computer the maximum number of books. Any value for X greater than your total of items is suitable. Lines 80 to 110 let the computer read all of the DATA lines and store them in its memory before the program begins. You may have as many DATA lines as you have items, beginning on line 560.

Lines 120 to 160 prompt you to determine whether you have to, or want to, use a printer. Hard copy of this type of information is sure to impress youngsters.

The manner in which you want the information processed and formatted is determined on lines 180 to 250. There are three possible formats in this program, but you, of course, may decide on more or less choices, depending on the type of items you are categorizing.

I personally felt it important to contain each item's total printout to the 32 character limitation of the Color Computer. Some children cannot handle reading printouts that break up onto two lines. Therefore, lines 300, 380, and 460 only permit printing of the first 17 characters of the title. You may change this to suit your own program's needs. Since printers permit 80 characters per line, no modification of A\$'s length was needed on lines 310, 390, and 470.

This program was meant to be the framework or guide to simple data manipulation for children. Let the child select his own objects to be used and his own categories for sorting. This will provide a new avenue of use for computers for the child. We, at Computer Island, are always interested in how children make use of the various programs we write for them. Please drop us a line from time to time and keep us informed.

The Listing:

10 REM" STEVE BLYN" 16K 20 REM" COMPUTER ISLAND" ECB 3Ø REM"COLLECT" 4Ø CLS 50 REM" X IS ANY NUMBER GREATER THAN THE TOTAL AMOUNT OF BOOKS" 60 X=50 7Ø DIM A\$(X),B\$(X),C\$(X) 80 FOR T=1 TO X 9Ø READ A\$(T), B\$(T), C\$(T) 100 IF A\$(T)="XXX" THEN 120 11Ø NEXT T 120 PRINT"DO YOU HAVE A PRINTER" :: INPUT P\$ 130 REM"***PL\$ WILL DETERMINE IF YOU HAVE A PRINTER" 14Ø PL\$=LEFT\$(P\$,1) 15Ø PRINT 160 IF PL\$="Y" THEN PRINT"BE SUR E TO TURN ON YOUR PRINTER" 17Ø PRINT 18Ø PRINT"CHOOSE HOW YOU WANT TO SEE BOOKS" 190 PRINT"YOU MAY- 1. SEE ALL TH E BOOKS" 200 PRINT" CHOOSE ANY **AUTHOR"** 21Ø PRINT" CHOOSE BY ANY RATING" 22Ø PRINT" ENTER 1 OR 2 OR 3" :: INPUT A 23Ø IF A>3 THEN 22Ø 24Ø IF A=2 THEN 34Ø 25Ø IF A=3 THEN 42Ø 26Ø CLS 27Ø GOSUB 51Ø 28Ø FOR T= 1 TO X 29Ø IF A\$(T)="XXX" THEN 49Ø 300 PRINTTAB(0)LEFT\$(A\$(T),17)TA B(18)LEFT\$(B\$(T),12)TAB(29)C\$(T)

VIC-64

VIC-20

SINCLAIR

TIMEX



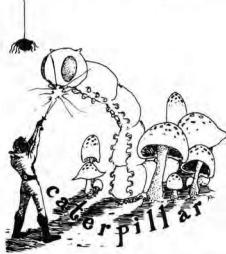
QUEST — A NEW IDEA IN ADVENTURE GAMES! Different from all the others. Quest is played on a computer generated map of Alesia. Your job is to gather men and supplies by combat, bargaining, exploration of ruins and temples and outright banditry. When your force is strong enough, you attack the Citadel of Moorlock in a life or death battle to the finish. Playable in 2 to 5 hours, this one is different every time. 16k TRS-80, TRS-80 Color, and Sinclair. 13K VIC-20. \$14.95 each.



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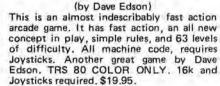
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This document was prepared using a TRS-80(TN) Color Computer, the <u>Super "Color" Mriter II</u>, an Epson MX-80 Graftrax Plus (TN), and an NEC Spinwriter 3510 (TN) to illustrate the great flexibility in formatting allowed by the <u>Super "Color" Mriter II</u>.

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COMPARISON CHART	SUPER	COLOR	WRITER	THE	COMPE	TITION
System Size	4K	16K	32K	4K	16K	32K
TAPE: Text space	N/A	7K	23K	N/A	2K	18K
ROMPAK: Text space	2.5K	16K	31K	N/A	N/A	N/A
DISK: Text space	N/A	5.5K	21.5K	N/A	0.5K	16.5K
Right Justify		YES			NO	
Video Window		YES			NO	
Edit any ASCII File		YES			NO	
Programmable Function		YES			NO	

The figures speak for themselves and with professional features like PROGRAMMABLE function string commands to perform up to 28 commands automatically. PROGRAMMABLE text file chaining, PROGRAMMABLE column insert & delete, and right hand JUSTIFICATION with punctuation precedence, the choice is clear but there's still more! In their September '82 issue, "80 MICRO" says, "The Color Computer has finally come of age. Nothing illustrates that coming of age better than this offering (SUPER "COLOR" WRITER) by Nelson Software". The Super "Color" Writer takes full advantage of the new breed of "smart printers" with Control codes 1-31, 20 Programmable control codes 0-255 for special needs. Works perfectly with all Epson, Radio Shack, Okidata, NEC, IDS, Centronics, Citoh, Smith Corona, Diablo Etc., Matrix, or Letter Quality Printers.

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310 IF PL\$="Y"THEN PRINT#-2, TAB(2) A\$ (T) TAB (3Ø) B\$ (T) TAB (5Ø) C\$ (T) 32Ø NEXT 33Ø GOTO 49Ø 340 CLS:PRINT"WHICH AUTHOR'S BOO KS DO YOU WANT": INPUT H\$ 35Ø GOSUB 51Ø 36Ø FOR T=1 TO X 37Ø IF A\$(T)="XXX" THEN 49Ø 38Ø IF B\$(T)=H\$ THEN PRINTTAB(Ø) LEFT\$(A\$(T),17) TAB(18)LEFT\$(B\$(T),12) TAB(29)C\$(T) ELSE 400 39Ø IF PL\$="Y" THEN PRINT#-2, TAB (2) A\$ (T) TAB (3Ø) B\$ (T) TAB (5Ø) C\$ (T) 400 NEXT T 41Ø GOTO 49Ø 420 CLS: PRINT"WHICH RATING DO YO U WANT TO SEE": INPUT R\$

43Ø GOSUB51Ø
44Ø FOR T= 1 TO X
45Ø IF A\$(T)="XXX" THEN 49Ø
46Ø IF C\$(T)=R\$ THEN PRINTTAB(Ø)
LEFT\$(A\$(T),17)TAB(18)LEFT\$(B\$(T),12)TAB(29)C\$(T) ELSE 48Ø
47Ø IF PL\$="Y"THEN PRINT#-2,TAB(2)A\$(T)TAB(3Ø)B\$(T)TAB(5Ø)C\$(T)
48Ø NEXT T
49Ø END
5ØØ REM"THIS PART PRINTS HEADING
S"
51Ø PRINT:PRINTTAB(2) "NAME OF BO

OK"TAB(18) "AUTHOR"TAB(26) "RATING 52Ø PRINT"-53Ø IF PL\$="Y" THEN PRINT#-2, TAB (2) "NAME OF BOOK"TAB (3Ø) "AUTHOR" TAB(50) "RATING": PRINT#-2," " 54Ø RETURN 550 REM"ENTER YOUR DATA HERE" 56Ø DATA SHERLOCK HOLMES, DOYLE, B 570 DATA HAUNTED BRIDGE, KEENE, C 58Ø DATA HUCKLEBERRY FINN. TWAIN. 590 DATA ENCYCLOPEDIA BROWN, SOBO L.A 600 DATA TOM SAWYER, TWAIN, A 610 DATA KEYSTONE KIDS, TUNIS. A 620 DATA THE FOOT BOOK, DR. SEUSS, 63Ø DATA IRON DUKE, TUNIS, B 640 DATA CAT IN THE HAT, DR. SEUSS .A 650 DATA BUNGALOW MYSTERY, KEENE, 66Ø DATA XXX,Y,Z

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Rainbow's Adventure Contest Results Next Month

the RAINBOW

Keep your fingers crossed.

The Rainbow Adventure Game Contest deadline for entries has now passed . . . but the jury is still out. We can report that the judges are still scratching their heads, jotting down notes and otherwise studiously reviewing the games we received.

Yes, we had promised to publish the results earlier, but we simply underestimated the amount of time (and the number of entries) it would take for judging. So, we will now announce the winners—and the honorable mentions—in next month's (January) issue.

It is taking a concentrated effort to meet the deadline. But, we intend to fully and fairly review every entry and January's issue is as early as we can realistically do that. And a job it is too, a mixture of both fun and frustration.

The entries represent a wide variety of games. Some are written for 4K but most for 16K or 32K. Knock on wood. A couple have had loading problems. As of this writing, we are trying again. If you think there might be trouble, you could rush us another copy. Those of you who took the trouble to make several saves were smart to do so.

While we have yet to see all the entries in action, we can report that some are quite good and rank right along with those commercially available. Others require some patience and persistance on the part of the judges. Yes, some have bugs.

If you submitted an entry, you should have long since received an acknowledgement of our having received it.

Due to the support of our advertisers, winners, runnersup and honorable mentions will all receive prizes. Stay turned. The list will be printed next month.

Some comments about our judging philosophy might be in order. We are looking at the entire package from the consumer's point of view, not from the technical side. That is, your programming technique may well add to the game's creativity, responsiveness and entertainment value, but you don't win any special points for "pretty printing," variety of techniques used, or other technical mastery unless it's evidenced in the actual running of your Adventure. We are not reading the listing as a part of the judging excercise.

In judging, we also feel you should not have any special computer knowledge in order to play and enjoy the game. Your Adventure should be simple enough that most people can play it without assistance from the household's computer expert. For this reason, we have selected judges with varying levels of computer expertise, including one judge who has almost no knowledge of computers whatsoever. We think this is an important consideration and hope that our contestants were through enough to try their games out on other people before sending them in.

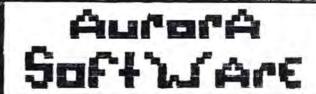
Other considerations we are looking at are creative use of

sound, colors, vocabulary, traps, surprises and variety in action.

While Rainbow has provided the judges with a standardized scoresheet and provided space for the judges to make individual comments, we have asked the judges to weigh heavily the "playability" and entertainment value—as well as the game's "addictiveness." That is, we believe the game should "grow" on people—not be played just once and shelved.

The winning Adventure will be featured in next month's Rainbow. So, everyone will benefit from this game. And, remember, we will announce details for a Simulation Contest next month as well.

Meanwhile, have patience. Remember, the judges are dying a thousand deaths in an effort to meet their deadline.



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On Printing Alphanumerics In Eight Directions

By Joseph Kolar

16K ECB

Do you have a need to print alphanumeric characters vertically on your Hi-Res graphic page? Do you love to concatinate? Would you like to see the A (angle mode) of the draw statement in operation? Do you want it simple? Then this is for you!

You might want to review the draw statement in the extended color manual.

For brevity,"+" will be used for concatination (linking together in a series) in this article hereinafter.

The purpose of this program is to allow you to print alphanumeric characters in any of the eight motion directions as used in the draw command. To wit: U=UPWARDS, L=TO THE LEFT, R=TO THE RIGHT, E=UP AND TO THE RIGHT, F=DOWN AND TO THE RIGHT, G=DOWN AND TO THE LEFT, H=UP AND TO THE LEFT. D is not used since it is the default direction.

The draw command: Draw "AS8BMH,V" must be used to locate the area where the first character will be situated. A is the angle option (more on this later). S8 is the size used in this program which generates a 15 by 15 locating matrix. H means horizontal, and V means vertical.

Sizes larger than S8 work well but allow less lettering on the screen.

The alphanumeric variables are easy to remember. The letter A=LA\$, B=LB\$, and so forth through Z which=LZ\$. The numerals run from 0=NO\$, 1=N1\$ through 9=N9\$. P\$ is the one punctuation mark.

The seven directional variables are U\$=UPWARDS, L\$=TO THE LEFT, R\$=TO THE RIGHT, E\$=UPWARDS AND TO THE RIGHT, F\$=DOWNWARDS TO THE RIGHT, G\$=LEFT AND DOWNWARDS, H\$=UPWARDS AND TO THE LEFT. There is no variable for a downward direction since it is the default direction. Finally, S\$=an empty space and is used to separate words in any direction.

The program works in locating the starting position on the screen via draw "AS8BMHY." Then "+" the letter that will be in that position. If you are heading vertically downwards merely "+" each additional letter. However, if you change direction "+" the desired directional variable and then "+" the next character variable. Each time you are in a direction other than vertical, you must preface each character variable with a directional variable.

There you have it! It shouldn't take you much time to memorize the variables or the method of keying. It is all +, +, +ing! The only time you would use anything but a variable would be when you were starting from a new location.

My purpose for this program is to append it to another program, create with it, and then delete all variable lines not used in the main program to conserve memory. The program starts at line 10000 to avoid the need to renumber the program. There are no dim statements or read/data routines to complicate the linking of this program to the graphic program.

Remember as you "+," that if your string runs over 225 characters, you will get OS error message. Simply chop off the last few variables and start them on the next line in a draw statement.

The characters of the alphanumeric variables were created sideways on a 4 by 4 matrix. A or A1 is inserted in the draw statement to rotate the characters 90 degrees clockwise to stand up. For the heck of it, run the program examples without the A option and you will get gift-wrapped garbage!

Key-in the program and run it. What you have on the screen is the first example. This demonstrates printing in four directions in a counter clockwise direction with just one locating statement. Note that as you go vertically you do not need directional variables due to it being the default direction. Merely "+" the character variables. To change direction "+" the desired directional variable and then "+" a character variable.

The rule is, "+" directional variable "+" character variable, except when in the vertical downwards mode where the rule is "+" character variable.

change line 10585 to read draw G\$+LJ\$ and you will have made a complete circle and put a J on top of the first character that was printed in line 10510. To prove the point, change line 10585 to draw G\$+LX\$ and you will superimpose an X over the verticle J. Change line 10585 back to 10585 GOTO 10585.

You can easily visualize the "+ing" in the first example by following each "+." Look at line 10560 and say to yourself, "GO UP PRINT O GO UP PRINT J GO UP TO THE LEFT." Then line 10570, "PRINT R, GO LEFT PRINT A."

Delete line 10585. The second example will be "+" to the first program. When I +, I +! This will give you a nice idea of how effortlessly you can create vertical lines of print. Note that there are no directional variables required due to the default mode. Just "+" one character after another and separate the words with "+" S\$.

Insert line 10645 GOTO 10800. This "+" the third

example to the first example. This shows off diagonal lettering. Note that when print is in an upward or left direction, you have to work backwards. To wit: "+" directional variable "+" last letter of word "+" directional variable "+" next to last letter in word, and so forth to the first letter in the word.

Before you append this program, or when you master the system, delete lines 10490 through 10900 and change line 10000 to read 10000 REM. After you are finished with your creative effort, you may want to delete the lines of any variables you did not use, to conserve memory.

This is a very simple, easy to use appendable program to create title pages or enhance your hi-res graphics. Or, you can use it as a stand-alone program. Surely, you creative programmers will

dream up other uses. So, have fun! The Listing: 10000 '*** DELETE LINES 10490-10 900BEFORE APPENDING THIS PRO- GR AM! *****SEE REM AT END***** 10010 ' LAS TO LZS =ALPHABET 10020 ' NO\$ TO N9\$ =NUMERALS 10030 ' P\$= PUNCTUATION 10040 R\$="BM-6,-8" 'CHANGE FROM VERICAL TO HORIZ. 10050 L\$="BM-6,+8" ' FROM VERTIC AL TO HORIZ. LEFT 10060 U\$="BM-12,0" 'CHANGE HOR. TO VERT. (UPWARDS) 10070 S\$="BM+6,+0"'EMPTY BLOCK 10080 F\$="BM+0,-8"'VERT DOWN TO HORIZ RIGHT 10090 E\$="BM-12,-8"'HORIZ RIGHT TO VERT UP 10100 G\$="BM+0,+8"'HORIZ LEFT TO VERT DOWN 10110 H\$="BM-12,+8"'VERT UP TO H ORIZ LEFT 10120 LA\$="BRNR3HU2ERND4R2BD4BR2 10130 LB\$="NR4U3EFND3EFD3BR2" 10140 LC\$="BRNR2HU2EBR2FD2GBR3" 1Ø15Ø LD\$="NR4U3ER2FD3BR2" 10160 LE\$="NU3R2NU2R2NU4BR2" 1Ø17Ø LF\$="NU4R2NU2R2BR2"

1Ø18Ø LG\$="NR4U4BR2NDRFD3BR2" 1Ø19Ø LH\$="R2NR2U4NL2R2BD4BR2" 10200 LI\$="BU2R4BD2BR2" 1Ø21Ø LJ\$="BU4R3FD2GLBR4" 10220 LK\$="NR4BU4F2ND2E2BD4BR2" 10230 LL\$="R4NU4BR2" 10240 LM\$="NR4E2H2R4BD4BR2" 10250 LN\$="NR4E4NL4BD4BR2" 10260 LO\$="BRNR2HU2ER2FD2GBR3" 10270 LP\$="NR4U3EFD3BR4" 10280 LQ\$="BRNR2HU2ER2FDNLNRDGBR 10290 LR\$="NR4U3EFND3BDE2BD4BR2" 10300 LS\$="BU3NED2FEU2EFD2GBR3" 10310 LT\$="U2NU2R4BD2BR2" 10320 LU\$="NR3BU4R3FD2GBR3"

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1Ø33Ø LV\$="NR2BU4R2F2G2BR4" 10340 LW\$="NR4BU4R4G2F2BR2" 10350 LX\$="E4BL4F4BR2" 10360 LY\$="BU4F2NG2R2BD2BR2" 10370 LZ\$="U4F4NU4BR2" 10380 P\$="BE2RBD2BR3" 1Ø39Ø NØ\$=LO\$ 10400 N1\$="BEHR4BD2BR2" 1Ø41Ø N2\$="U3EFD3R2NU4BR2" 10420 N3\$="U3EFND2EFD3BR2" 10430 N4\$="BU3NR4F3NU4BR3" 1Ø44Ø N5\$="NU4R2U3EFD3BR2" 1Ø45Ø N6\$="BU3NED2FR2HU2EFD2GBR3 10460 N7\$="U4RF3BD2BR2" 10470 N8\$="BRHU2EFND2EFD2GHGBR5" 1Ø48Ø N9\$="BRHU2ENR2FD2GBR2EU2HB D4BR3" 10490 ' EXAMPLE # 1 10500 PMODE4, 1: PCLS: SCREEN1, 0 10510 DRAW "ASSBM76,62"+LJ\$+LO\$+ LS\$+LE\$+LP\$ 1Ø52Ø DRAW LH\$+F\$+LK\$ 10530 DRAW R\$+LO\$+R\$+LL\$+R\$+LA\$ 10540 DRAW R\$+LR\$+E\$+LH\$ 10550 DRAW U\$+LP\$+U\$+LE\$+U\$+LS\$ 19569 DRAW U\$+LO\$+U\$+LJ\$+H\$ 10570 DRAW LR\$+L\$+LA\$ 10580 DRAW L\$+LL\$+L\$+L0\$+L\$+LK\$ 1Ø585 GOTO 1Ø585 10590 FOR X= 2 TO 14 STEP 2 10600 CIRCLE(124,96),X,1 19619 NEXT 10620 FOR X=14 TO 2 STEP-2 10630 CIRCLE(124,96),X,Ø 10640 NEXT 10650 ' EXAMPLE #2 10660 DRAW "BM20,20"+LJ\$+LU\$+LL\$ +LY\$+5\$ 19679 DRAW N1\$+N9\$+S\$+N1\$+N9\$ 19689 DRAW N8\$+N2\$ 10690 DRAW "BM220,16"+LI\$+LN\$+LV \$+LE\$+LR\$+LN\$ 10700 DRAW LE\$+LS\$+LS\$+S\$+LF\$ 10710 DRAW LL\$+LA\$ 10720 GOTO 10590 10800 ' EXAMPLE # 3 10820 DRAW"BM6, 2"+N1\$+F\$+N9\$+F\$+ N8\$+F\$+N2\$ 10830 DRAW"BM6, 180"+N1\$+E\$+N9\$+E \$+N8\$+E\$+N2\$ 10840 DRAW"BM244,2"+N2\$+G\$+N8\$+G \$+N9\$+G\$+N1\$ 10850 DRAW"BM244, 180"+N2\$+H\$+N8\$ +H\$+N9\$+H\$+N1\$ 10860 GOTO 10590 10890 '***TO VIEW 2ND EXAMPLE, D ELETE LINE 10585.

10900 '***TO VIEW 3RD EXAMPLE IN SERT LINE....10645 GOTO 10800 €



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Music...

This Is Just Like Music To Your Eyes



By Larry Konecky



The Music Processor, which was written as a visual aid for music theory classes, could well become a valuable tool in the library of the musically-inclined computerist.

Provisions are made in the program for saving and loading examples to and from tape storage, and a screen print program may be used for printing assignments or short music examples.

The Music Processor itself is menu based, but the menu is not displayed on the screen. After the program is loaded and "RUN" entered, all that will appear on the screen is the grand staff on a black background. Upon the staff may be drawn notes, rests, time signature, bar lines, accidentals, slurs, fermatas, and pointers. Below the staff may be placed symbols for figured bass and roman numeral identification of chords. Control for the placement of the various symbols is obtained by positioning a blinking cursor with the right joystick and pressing various keys. Figure 1 is a chart of the menu and functions of the keys.

The main menu containes nine functions. "C" is the first function listed. Position the cursor at the desired location by adjusting the right joystick control and press "C." The cursor will stop blinking and the functions within the chalk menu may now be chosen. (The keys in the chalk menu will be discussed later.) Pressing "R" will pass control to the erase menu. To ensure proper erases of previously drawn symbols the cursor must be set as close as possible to the original cursor position used for drawing the symbol to be erased. Pressing "K" will save to tape all symbols that appear on the screen and also any that have been improperly erased. Before pressing "K" you must be sure that the tape is properly positioned, the recorder set for record, and the volume level properly adjusted. Pressing "M" will clear the screen and memory of present symbols, will load the next example stored on tape, and will draw the example onto the screen. Just as with "K" the tape must be properly positioned and the recorder properly adjusted for loading of data. Pressing the up arrow, down arrow, OR lrft arrow keys will allow drawing of stem up or stem down notes or rests without having to press "C." Pressing "CLEAR" erases the screen, erases memory, and redraws the grand staff. Pressing "Z" provides a memory check and/or redraw function. The screen is cleared and the musical symbols are redrawn as if they had been loaded from tape. Remember to

position the cursor before pressing "C," "R," or any of the arrow keys. If the cursor is in the incorrect location, press "ENTER" and control is returned to the joystick and main menu.

The chalk menu consists of two parts (staff and below staff). Use of either part is automatically selected by the position of the cursor. If the cursor moves below the fourth ledger line below the staff control is shifted to the below staff menu.

The staff keys, "S" for sharp, "F" for flat, "X" for double sharp, and "N" for natural are used by placing the cursor on the desired line or space and pressing the proper key. To place a bar line, position the cursor in the desired horizontal position anywhere vertically on the staff and press "B." For time signatures position the cursor in the desired horizontal position anywhere vertically on the staff, then press "T," following immediately with four numbers. The numbers will be placed in the horizontal position of the cursor moving vertically from the top of the grand staff to the bottom of the staff. The dot "." will appear just above the present cursor position. The slur ":" may be used along with the dot to draw a fermata. The pointer right arrow is provided for instructional purposes.

Each of the stem or rest keys moves control to a menu allowing selection of whole, half, quarter, and eighth notes or rests. Provisions are made to automatically draw up to three ledger lines above or below both treble and bass staffs. Pressing "C" is optional with either of these three arrow keys.

Below the staff, placement is limited to four vertical positions for figured bass symbols and two for Roman numerals. Refer to *Figure 2* for three examples of where symbols are placed. Markers are provided at each side of the screen at the upper Roman numeral position for the user's convenience.

The erase menu contains two parts (staff and below staff). To erase stem up or stem down notes or slurs, use the corresponding arrow key for the notes, and either one for the slur. "N" will erase accidentals, rests, dots, and pointers. To erase the bar, position the cursor in the original horizontal position and press "B." (Any vertical position within the staff will work.) To erase the time signature,

Music Procesor Keving Chart

Main Menu

'C' = Chalk

'R' = Erase

'K' = Save

'M' = Load

' UP ARROW '= Stem Up

'DOWN ARROW' = Stem Down

'LEFT ARROW' = Rest

'CLEAR' = Erase Screen and Memory

'Z' = Memory Check and Redraw

Chalk Menu

'ENTER' = Return to

Main Menu

STAFF	Below Staff
':' = Slur	(4 lines)
'RIGHT' = Pointer	1
'S' = Sharp	'1-9' = Numbers
'F' = Flat	
'X' = Double Sharp	'S' = Sharp
'N' = Natural	'F' = Flat
∵ = Dot	'X' = Double Sharp
'B' = Bar	'N' = Natural
'T' = Time Signature	'-' = -
(Plus 4 numbers	'+' = +
top to bottom)	'0' = o
	'D' = d
	'/' = /
'UP', 'DOWN', or 'LEFT'	'RIGHT' = Pointer

'W' = Whole	(2 lines)
'H' = Half	T' = I
'Q' = Quarter	'V' = V
'E' = Eighth	'L' = i
'ENTER' = Return to	'Il' = v

Main Menu

Staff 'UP' = Stem Up 'DOWN' = Stem Down 'N' = Accidentals 'T' = Time Signature 'B' = Bar **BELOW STAFF** '1-9' = Any Erase 'ENTER' = Return to Main Menu 'ENTER' = Return to Main Menu (All Erases must be close to original cursor position as

possible for proper erases.)

Erase Menu

MUSIC PROCESSOR VARIABLES

N(E) = Symbol indicator (38 different symbols possible)

A(E) = X axis position (horizontal)

B(E) = Y asix position (vertical)

E = Main counter (counts # of symbols used)

(may be increased to 70 without a screen Print loaded.)

X = JOYSTCK(0)*4

Y = JOYSTCK(1)*3

D = Redraw indicator (1 to draw, 0 to ignore)

K = Loading indicator (1 to draw, 0 to ignore)

T = Time signature indicator (1 to draw, 0 to ignore)

Q = Time signature loop counter

L and M = Roman numeral positions to draw

P and C = Cursor color indicators

Z, W, I, F. and H = Loop counters

J = End of main count indicator

FIGURE 2



I II III IX X AI AU I





I IX Ie X 11 Y 1 follow the same procedure for positioning the cursor as in erasing the bar and then press "T." Pressing "ENTER" will switch control back to the main menu and joystick without

making any erases.

Erasing below the staff is provided by pressing any one of the number keys. In order that proper memory erases occur, position the cursor in the original position that the particular symbol was drawn. It is possible for the erases to overlap symbols not intended to be erased. If this happens, press "Z," and the example will be redrawn with the present symbols contained in memory.

Remark statements have been left out of the program because it is rather lengthy and uses up the majority of the memory of a 16K machine. If you are not using a screen print program, the dimensions in statement two of the statement outline may be increased to 70.

Music Processor Statement Outline

2-16 Draw Grand Staff

5-7 Staff

8-13 Cleft Signs

17-28 Cursor Control

29-38 Main Menu

39-71 Staff Menu

39-44 Rests

45-59 Basic Staff Menu

60-65 Stem Up

66-71 Stem Down

72-97 Below Staff Menu

72-81 Numbers

82-85 Roman Numerals

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2 PMODE 4,1:DIM N(64),A(64),B(64 3 E=1 4 PCLS:SCREEN1.1 5 FORZ=1TO5:LINE(2,(Z*6+33))-(25 Ø, (Z*6+33)), PSET: LINE (2, (Z*6+87))-(25Ø, (Z*6+87)), PSET: NEXTZ 6 LINE(2,39)-(2,117), PSET: LINE(3 ,39)-(3,117),PSET 7 LINE(250,39)-(250,117),PSET:LI NE (251, 39) - (251, 117), PSET 8 DRAW"BM18,33D1L1D33L1D1L1D1L1U 1L2U1L1U2R2D1L1" 9 DRAW"BM13,56" 10 FORZ=1TO2: DRAW"BM+1, 0H1U1E2R4 F3D4G3L5H5U1H1U2E1U1E14U4H3G2" 11 DRAW"BM-7,+66H1NR2U1R2H1E1R6D 1R1F1D1F1D2G1D2G1D1G1D1G1D1G6" 12 DRAW"BM+14,-20D1BM+0,+5D1" 13 DRAW"BM14,56":NEXTZ 14 PSET(4, 159, 5): PSET(249, 159, 5) 15 IFD=1THENJ=E:GOTO154 16 IFK=1THEN151 17 X=JDYSTK(Ø)*4:Y=JOYSTK(1)*3:P =PPOINT(X,Y) 18 PSET(X,Y,P) 19 X=JOYSTK(Ø) *4: Y=JOYSTK(1) *3 2Ø IFX<8THENX=8 21 IFX>246THENX=246 22 IFY<15THENY=15 23 IFY>168THENY=176:GOTO27 24 IFY>159THENY=168: GOTO27 25 IFY>15ØTHENY=159:GOTO27 26 IFY>142THENY=15Ø 27 P=PPOINT(X,Y): IFP=5THENC=ØELS EC=1 28 PSET(X,Y,C) 29 IFPEEK (341) = 254THEN45 3Ø IFPEEK (34Ø) = 251THEN1Ø8

31 IFPEEK (339)=191THEN146 32 IFPEEK (341) = 253THEN148 33 IFPEEK (34Ø) = 247THEND=1:GOTO4 34 IFPEEK (343) = 253THENK=1:GOTO14 6 35 IFPEEK (341)=247THEN6Ø 36 IFPEEK (342) = 247THEN66 37 IFPEEK (343) = 247THEN39 38 GOTO18 39 IFPEEK (345) = 251THENN (E) = 35: GO T0163 4Ø IFPEEK (338) = 253THENN (E) = 35:GO T0163 41 IFPEEK (339) = 251THENN (E) = 36: GO T0163 42 IFPEEK (343) = 254THENN (E) = 37: GO TD163 43 IFPEEK (338)=191THEN18 44 GOT039 45 IFY<142THEN46ELSE72 46 IFPEEK (341) = 247THEN60 47 IFPEEK (342) = 247THEN66 48 IFPEEK (338) = 191THEN18 49 IFPEEK (342) = 251THEN N(E) = 10:T =1:E=E+1:GOT098 5Ø IFPEEK (343) = 247THEN39 51 IFPEEK (341) = 251THENN (E) = 11:GO T0163 52 IFPEEK (344) = 254THENN (E) = 12: GO T0163 53 IFPEEK (338) = 247THENN (E) = 13: GO T0163 54 IFPEEK (344) = 253THENN (E) = 14:60 T0163 55 IFPEEK (344) = 223THENN (E) = 34:GO T0163 56 IFPEEK (340) = 254THENN (E) = 23:GO T0163 57 IFPEEK (344) = 247THENN (E) = 33: GO T0163 58 IFPEEK (34Ø) = 223THENN (E) = 38:GD T0163 59 GOTO46 60 IFY>142THEN72ELSEIFPEEK (345) = 251THENN(E)=15: GOTO163 61 IFPEEK (338) = 253THENN (E) = 16:GO T0163 62 IFPEEK (339) = 251THENN (E) = 17: GO T0163 63 IFPEEK (343) = 254THENN (E) = 18:GO T0163 64 IFPEEK (338) = 191THEN18 65 GOTO6Ø 66 IFY>142THEN72ELSEIFPEEK (345) = 251THENN(E)=19:GOTO163

67 IFPEEK (338) = 253THENN (E) = 20:GO

68 IFPEEK (339) = 251THENN (E) = 21:GO

T0163

T0163

69 IFPEEK (343) = 254THENN (E) = 22:60 T0163 7Ø IFPEEK (338) = 191THEN18 71 GOT066 72 IFD=10RK=1THEN17ØELSEIFPEEK(3 39) = 239THENN(E) = 1: GOTO163 73 IFPEEK (34Ø) = 239THENN (E) = 2: GOT 0163 74 IFPEEK (341) = 239THENN (E) = 3: GOT 0163 75 IFPEEK (342) = 239THENN (E) = 4: GOT 0163 76 IFPEEK (343) = 239THENN (E) = 5: GOT 0163 77 IFPEEK (344) = 239THENN (E) = 6:GOT 0163 78 IFPEEK (345) = 239THENN (E) = 7: GOT 0163 79 IFPEEK (338) = 223THENN (E) =8: GOT 0163 8Ø IFPEEK (339) = 223THENN (E) = 9:GOT 0163 81 IFT=1THEN72 82 IFPEEK (339) = 253THENN (E) = 24:60 T0163 83 IFPEEK (344) = 251THENN (E) = 25: GO T0163 84 IFPEEK (342) = 253THENN (E) = 26:GD T0163

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85 IFPEEK (343) = 251THENN (E) = 27:GO T0163 86 IFPEEK (341) = 251THENN (E) = 11:GO T0163 87 IFPEEK (344) = 254THENN (E) = 12:60 T0163 88 IFPEEK (338) = 247THENN (E) = 13:60 T0163 89 IFPEEK (344) = 253THENN (E) = 14:GO 9Ø IFPEEK (343) = 223THENN (E) = 28: GO T0163 91 IFPEEK (341) = 223THENN (E) = 29:60 T0163 92 IFPEEK (338) = 239THENN (E) = 30: GO T0163 93 IFPEEK (342) = 254THENN (E) = 31:GO T0163 94 IFPEEK (345) = 223THENN (E) = 32: GO 95 IFPEEK (344) = 247THENN (E) = 33: GO T0163 96 IFPEEK (338) = 191THEN18 97 GOTO72 98 FORQ=1TO4 99 DRAW"S4BMØ.155":FORZ=1TOX/4:D RAW"BM+4, +Ø": NEXTZ 100 ON Q GOTO 101,102,103,104

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101 DRAW"S4BM+0.-104S8":GOTO72 102 DRAW"S4BM+0, -92S8":GOTO72 103 DRAW"S4BM+0,-50S8":GOTO72 104 DRAW"S4BM+0,-38S8":GOTO72 105 IFK=10RD=1THENI=I+1 106 NEXTQ: T=0: DRAW"S4BM0, 155" 107 GOTO18 108 PSET(X,Y,0): IFY>142THEN109EL SE115 109 FORZ=338T0345 11Ø IFPEEK(Z)=2390RPEEK(Z)=223TH ENFORW=X-4TOX+4:LINE(W,Y-6)-(W,Y +6) . PRESET: NEXTW: GOTO113 111 IFPEEK (338) = 191THEN18ELSENEX TZ 112 GOT01Ø9 113 FORI=1TOE 114 IFABS(A(I)-X)<4ANDABS(B(I)-Y)<6THEN134ELSENEXTI:GOTD18 115 IFPEEK (341) = 247THEN122 116 IFPEEK (342) = 247THEN123 117 IFPEEK (344) = 253THEN124 118 IFPEEK (34Ø) = 254THEN125 119 IFPEEK (342) = 251THEN141 12Ø IFPEEK (338) = 191THEN18 121 GOTO115 122 FORZ=Y-15TOY+4:LINE(X-6,Z)-(X+6, Z), PRESET: GOSUB127: NEXTZ: GOT 0139 123 FORZ=Y-4TOY+15:LINE(X-6,Z)-(X+6, Z), PRESET: GOSUB127: NEXTZ: GOT 013Ø 124 FORZ=Y-7TOY+4:LINE(X-5, Z)-(X +3, Z), PRESET: GOSUB127: NEXTZ: GOTO 130 125 LINE(X, 39) - (X, 117), PRESET 126 FORZ=1T05:PSET(X, Z*6+33,5):P SET (X, Z*6+87, 5): NEXTZ: GOTO130 127 IFZ=390RZ=450RZ=510RZ=570RZ= 63THENLINE (X-6, Z) - (X+6, Z), PSET 128 IFZ=930RZ=990RZ=1Ø50RZ=1110R Z=117THENLINE(X-6, Z)-(X+6, Z), PSE т 129 RETURN 13Ø FORI=1TOE 131 IFN(I)=23AND A(I)=X THEN134 132 IF(N(I-1)=1Ø)ANDABS(A(I)-X)< 5THEN137 133 IFABS(A(I)-X)<4ANDABS(B(I)-Y)<3THEN134ELSENEXTI:GOTO18 134 FORF=I TOE 135 N(F)=N(F+1):A(F)=A(F+1):B(F) =B(F+1) 136 NEXTF: E=E-1:GOTO19 137 FORF=I-1TOE+5 138 N(F)=N(F+5):A(F)=A(F+5):B(F) =B(F+5)139 NEXTF 14Ø E=E-5:GOTO19

141 FORZ=39T063

URN

142 LINE(X-5, Z)-(X+5, Z), PRESET: G **OSUB127** 143 NEXTZ 144 FORZ=93T0117:LINE(X-5,Z)-(X+ 5, Z), PRESET 145 GOSUB127:NEXTZ:GOTO13Ø 146 FORZ=ØTOE+1:N(Z)=Ø:A(Z)=Ø:B(Z)=Ø:NEXTZ 147 IFK=1THEN4ELSE3 148 OPEN"O",-1, "STAFF" 149 PRINT#-1.E:FORZ=1TOE:PRINT#-1, N(Z), A(Z), B(Z): NEXTZ 15Ø CLOSE#-1:GOTO18 151 OPEN"I",-1, "STAFF" 152 INPUT#-1, J:FORZ=1TOJ: INPUT#-1, N(Z), A(Z), B(Z): NEXTZ 153 CLOSE-1 154 FORI=1TOJ 155 E=I 156 X=A(E):Y=B(E) 157 IFN(E)=1ØTHENI=I+1:E=I:T=1:Q =1:X=A(E):Y=B(E):GOTO99 158 IFQ=4THENQ=0:T=0:DRAW"S4BM0. 155": GOTO16Ø 159 IFT=1THENQ=Q+1:GOTO99 16Ø GOTO164 161 NEXTI: K=Ø: D=Ø 162 GOTO17 163 A(E)=X:B(E)=Y 164 IFN(E)>9THEN168 165 IFT=1THEN17Ø 166 DRAW"BMØ, 155": FORZ=1TO(A(E)/ 4): DRAW"BM+4, Ø": NEXTZ: IFY>15ØTHE NDRAW"BM+Ø, +9": IFY>159THENDRAW"B M+Ø, +9": IFY>168THENDRAW"BM+Ø, +9" 167 GOTO17Ø 168 IFY>165THENL=178ELSEL=16Ø 169 IFY>165THENM=171ELSEM=153 17Ø ON N(E) GOSUB 174,175,176,17 7, 178, 179, 180, 181, 182, 72, 183, 184 , 185, 186, 199, 199, 199, 199, 205, 205 ,205,205,187,189,190,191,192,193 , 194, 195, 196, 197, 198, 188, 211, 212 ,213,214 171 IFK=10RD=1THEN161ELSEE=E+1 172 IFT=1THENFORH=1T0100:NEXTH:G OT01Ø5 173 GOTO18 174 DRAW"R1L4R2U6G1": RETURN 175 DRAW"R2L4E4U1H1L2G1":RETURN 176 DRAW"L1H1F1R2E1U1H1E1U1H1L2G 1": RETURN 177 DRAW"BM+1.ØU6G3D1R4":RETURN 178 DRAW"L1H1F1R2E1U2H1L3U2R4":R ETURN 179 DRAW"BM-2, -3D2F1R2E1U1H1L3U2 E1R2": RETURN 18Ø DRAW"BM-1, ØE1U1E1U1E2L5": RET

181 DRAW"R1E1U1H1L2H1U1E1R2F1D1G



1L2G1D1F1L1": RETURN 182 DRAW"L1R2E1U4H1L2G1D1F1R2":R ETURN 183 LINE(X-2, Y+1)-(X+2, Y+1), PSET :LINE(X-2, Y-1)-(X+2, Y-1), PSET:LI NE(X-1, Y+2)-(X-1, Y-2), PSET: LINE(X+1, Y+2) - (X+1, Y-2), PSET: RETURN 184 CIRCLE(X,Y), 2: LINE(X-1,Y+3)-(X-1, Y-7), PSET: RETURN 185 LINE(X-3,Y-2)-(X+1,Y+2),PSET :LINE(X-3,Y+2)-(X+1,Y-2),PSET:RE 186 LINE(X-2, Y+1) - (X-2, Y-3), PSET :LINE(X+1,Y-1)-(X+1,Y+3),PSET:LI NE(X-2, Y+1)-(X+1, Y+1), PSET: LINE(X-2, Y-1)-(X+1, Y-1), PSET: RETURN 187 LINE(X, 39) - (X, 117), PSET: RETU 188 PSET(X, Y-2):PSET(X-1, Y-2):RE TURN 189 LINE(X-1,L)-(X-1,M), PSET:LIN E(X-4,L)-(X+2,L), PSET: LINE(X-4, M)-(X+2, M), PSET: RETURN 190 LINE(X-4,L)-(X+4,L), PSET:LIN E(X-4, M)-(X+4, M), PSET: LINE(X, L-1)-(X-2, M+1), PSET: LINE(X, L-1)-(X+ 2, M+1), PSET: RETURN 191 LINE(X-1,L)-(X-1,L-3), PSET:P

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192 LINE(X-1,L)-(X-3,L-5), PSET:L INE (X-1, L) - (X+1, L-5), PSET: RETURN 193 LINE(X-3,Y+1)-(X+3,Y+1),PSET : RETURN 194 LINE(X-3,Y-1)-(X+3,Y-1),PSET :LINE(X,Y-4)-(X,Y+2),PSET:RETURN 195 CIRCLE(X,Y), 2: RETURN 196 CIRCLE(X, Y), 2: LINE(X+2, Y+1)-(X+2, Y-4), PSET: RETURN 197 LINE (X-4, Y+5) - (X+4, Y-2), PSET 198 LINE(X-5, Y-1)-(X+3, Y-1), PSET :LINE(X-1, Y-4)-(X+3, Y-1), PSET:LI NE(X-1, Y+2)-(X+3, Y-1), PSET: RETUR 199 IFY<34THENLINE(X-6,33)-(X+6, 33), PSET: IFY<28THENLINE(X-6, 27) -</p> (X+6, 27), PSET: IFY<22THENLINE (X-6 ,21)-(X+6,21),PSET 200 IFY<88ANDY>68THENLINE(X-6,87)-(X+6,87), PSET: IFY<82THENLINE(X -6,81)-(X+6,81), PSET: IFY<76THENL INE (X-6, 75) - (X+6, 75), PSET 201 CIRCLE(X,Y), 4: IFN(E)<16THENR ETURN 202 LINE(X+3,Y)-(X+3,Y-15),PSET: IFN(E)<17THENRETURN 203 CIRCLE(X,Y),3:CIRCLE(X,Y),2: CIRCLE(X,Y), 1:P=5: IFN(E)<18THENR ETURN 204 LINE(X+3, Y-15)-(X+6, Y-12),PS ET:LINE(X+6, Y-12)-(X+6, Y-9), PSET : RETURN 205 IFY>68ANDY<88THENLINE(X-6.69)-(X+6,69), PSET: IFY>74THENLINE(X -6,75)-(X+6,75), PSET: IFY>8ØTHENL INE (X-6, 81) - (X+6, 81), PSET 206 IFY>122THENLINE(X-6, 123)-(X+ 6, 123), PSET: IFY>128THENLINE (X-6. 129) - (X+6, 129), PSET: IFY>134THENL INE (X-6, 135) - (X+6, 135), PSET 207 CIRCLE(X,Y), 4: IFN(E)<20THENR ETURN 208 LINE(X-3,Y)-(X-3,Y+15),PSET: IFN(E)<21THENRETURN 209 CIRCLE(X,Y),3:CIRCLE(X,Y),2: CIRCLE(X, Y), 1:P=5: IFN(E)<22THENR ETURN 210 LINE(X-3, Y+15) - (X, Y+12), PSET :LINE(X, Y+12) - (X, Y+9), PSET: RETUR 211 FORZ=Y-3TOY-1:LINE(X-2,Z)-(X +2, Z), PSET: NEXTZ: RETURN 212 LINE (X-4, Y-8) - (X, Y-4), PSET:L INE (X, Y-4) - (X-4, Y), PSET: LINE (X-4 ,Y)-(X,Y+4),PSET:RETURN 213 LINE(X-4, Y+4) - (X+3, Y-4), PSET :CIRCLE(X-2, Y-3), 2: RETURN 214 LINE(X-6,Y)-(X,Y-3),PSET:LIN E(X, Y-3)-(X+6, Y), PSET: RETURN



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Software Review ...

Enchanted Forest Is An Enchanting Graphic Adventure

So far, just about every "graphic" Adventure game we have seen has been pretty much like a maze game. That is, you wander through a maze and come across various things.

Maze Adventures are not bad, by any means, but after a while a lot of them start to look the same. They can be enhanced with visual clues and the like but they pretty much are mazes.

Not so with *Enchanted Forest*, which uses the graphic screens to show you where you are—in a forest surrounded by trees. As the game opens up, there are three green and brown trees, a brown patch and a bunch of adventure waiting for you.

Enchanted Forest is written in Basic and the author is wise to keep the graphics simple—because they have to be drawn with each scene. No problem here, and they are colorful and interesting. All in all, they are a very welcome respite from the mazes.

Yes. Nice green grass. Pretty green trees. Purple tree frogs. And, oh no. We've broken a rule and told you something about the adventure. Yes, that thing is a tree frog.

Well, we weren't sure what it was. We tried a bunch of things and didn't get it right. Finally, we went a-hunting in the list of variables (one reason I like Basic Adventures—when I get stuck I can cheat) and figured out it was a tree frog. And, while I still have not found out what to do with the tree frog, at least I know what it is.

No matter, I liked this Adventure. Its different. The

graphics really enhance play, and it is not so slow in drawing them that it really slows down the game. After all, you should *think* your way through an Adventure—not hack and slash about!

The main way Enchanted Forest operates is to show you a scene and then let you press ENTER to get to the text screen for an entry. But, except for those "You Can't Go In That Direction"-type messages, all the results of your activities are shown on the graphic screen. For instance, one time I came across a sign but could not quite make out the letters. I told the program to "LOOK SIGN" and got a closeup of the sign that was easy to read.

The logic and necessity to think in the Enchanted Forest is up to snuff and it is a game to be recommended. We have only one major complaint, and it is not so much about the Enchanted Forest as it is about a great many Adventure games. That complaint is that all these games should try to either (1) use the same names for the same kinds of things (is it a cage, a cell or a jail?) or (2) there should be some kind of list of the unusual verbs and nouns. Let's put an emphasis on unusual, but a good Adventure is difficult enough without trying to figure out whether the author is calling an object a ROCK or a STONE.

(Some philosophy here, soft drinks are called "Pop" in Chicago, "Soda" in New York, "Coke" in Georgia and, I am sure, other things in other places. We ought to have some generic words in Adventures, though.)

Sorry about the digression. *Enchanted Forest* is a good Adventure, has some nice graphics and is fun to play. Enjoyable.

(Genesis Software, P.O. Box 936, Manchester, MO 63011, \$21.95)

™TRS80 color

From the January 1981 issue of the CSRA Computer Club newsletter

There was some amusement at the November meeting when the Radio Shack representatives stated that the software in the ROM cartridges could not be copied. This month's 68 Micro Journal reported they had disassembled the programs on ROM by covering some of the connector pins with tape. They promise details next month. Never tell a hobbyist something can't be done! This magazine seems to be the only source so far of technical informations on the TRS-80 color computer." Devoted to SS-50 6800 and 6809 machines up to now, 68 Micro Journal plans to include the TRS-80 6809 unit in future issues.

NOTE. This and other interesting and needed articles for the Radio Shack TRS-80 color computer ** are being included monthly in 68 Micro Journal—The Largest specialty computer magazine in the world!

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** Sample issue - \$3.50





68 Micro Journal" was established with one objective in mind; to provide a Magazine FOR 68xx Users BY 68xx Users. Because of a strict advertiser policy, 68 Micro Journal" has gained a strong following WORLDWIDE because the reader KNOWS what he is getting when purchasing from a 68 Micro Journal" Advertiser. It has gained a strong User following because most of the material published is contributed BY USERS, and, therefore, is relevant to the Users needs.

Currently, and even before the Color Computer hit the stores, 68 Micro Journal was devoting more space to the TRS-80C Color Computer and information concerning the Motorola 6809 (which is the CPU in the Color Computer) than ANY OTHER Computer Magazine. Examples Include:

REVIEWS of the three major Disk Control Systems for the Color Computer, most of the Monitors, Assemblers, and Disassemblers, Word Processors and Editors, "Terminal" Programs (for use with Modems, Communications with other Computers, etc.), and of course, Games.

HINTS for Expanding Memory, Power Supply Cooling, repairing sticky keyboards, disabling the ROM PAK "Take Over", hooking up to Printers, etc. DISCUSSIONS of the 6883 Synchronous Address

DISCUSSIONS of the 6883 Synchronous Address Multiplexer, using the Color Computer with 64K and 96K memory (which it is ALREADY capable of handling), thoughts on Programming, etc.

I suggest that you subscribe to **68 Micro Journal**, SCON, as many back issues are sold-out.

We still, and will continue to, lead in the type intermation you need to FULLY UTILIZE the POWER of the 6809 in the Radio Shack TRS-80 Color Computer.

Bob Nay
Color Computer Editor

Software Review ...

Graph Programs Give Fine High Resolution Drawing

Drawing on the high resolution graphic screen can be a frustrating experience—especially if you cannot draw very well. This being the case, we wondered whether the drawing appearing in Zeta Software's advertising was the product of a superior program or an outstanding artist.

The answer is, probably, both. We won't go into talking about the artistic merits of the sample program we got with *Graph-32*, but we can say that the program itself is a good one that will make up for some of the shortcomings in artistic ability.

Honestly, when we got the CoCo's Extended Basic upgrade more than a year ago, one of the things we were most excited about was the ability to do some drawing on the high res screen. And, even though we cannot draw, we figured the computer would be happy to help out. And, while we did turn out some fair to middlin' graphics, nothing was every really good.

We will not pretend that *Graph-32* will turn you into a Miro or Picasso (Pablo probably would have *loved* the CoCo), but it will certainly help you let your creative juices flow. It is easy to use and the results can be spectacular.

A character set is included with the program, and that allows you to easily type in characters on the graphic screen. You've seen this feature before. But *Graph-32* goes it one step further to let you change the characters at will—and even create special characters—to suit your needs. It is one of the best implementations of the "writing on the graphic screen" programs we have seen.

Entering lines, circles, boxes and painting is easy with one-letter commands, after which you add some parameters to fill in choices. And, if you don't like the way the image turns out, one key erases what you drew. Reverse images? One letter reverses everything you see on the screen.

The program also gives you a grid to make it easier to position things on the screen. And, the grid can be printed or not, depending on your desire.

Perhaps best of all there is both a fast and slow draw command. Since most of the drawing (but not the figure-making) is done by using the joysticks, you have the usual problem of moving the joystick too fast and creating dotted lines. This is true with the slow draw mode, but the fast draw won't give broken lines: It goes fast.

There is also ability to move images around the screen, either by erasing or laying over what was there. This, and the grid are only available with 32 K.

Maybe the best feature of all is the program does not lose its screens if you BREAK and then restart. Your screen can be saved to tape or disk (and printed out with the inclusion of a screen print driver not supplied with this package).

On the negative side, the program divides the screen up into smaller blocks and you have to "jump" around from one to the other with the arrow keys. This is not as difficult as it seems, but does take some getting used to.

There are 14 half-pages of documentation included—an adequate amount for a program like this. We wish some sections were a little more clear, but the instructions, on the whole, are better than most.

This is a fine program which does a good job and should provide a great deal of enjoyment and utility (at a reasonable price) for those who wish to draw either complicated pieces or experiment with art on the highest resoulution graphic screen.

(Zeta Software, P.O. Box 3522, Greenville, SC 29608-3522, \$16.95 for 16K, \$19.95 for 32K, \$22.95 for 32K disk plus \$2.50 s/h))

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Games.

WK ECB From Out of the Blue Comes This Dexterity Te

J.E. Bennett and C.E. Laidlaw

Parachuse Jump is a one-player game which will test your manual desterity with the right joystick on a 16K extended basic machine. The program uses just ove 7K of memory.

The object of this game from JARB Softy are is to land on the landing pad, or as close to it as an, while avoiding the bomb dropped by an invisible mad bomber. You must allow for the wn d in king our decent.

The score from your last jump and your total score are shown in the upper left-hand corner of the screen, while the wind speed (0-5 MPH), direction, and number of times the mad bomber has hit you are shown in the upper right-hand corner of the screen. When you are ready, push the joystick button to jump, and then control your descent with the joystick. Left and right will control your direction, while up and down control the speed of your descent (up=slow and down=fast). If you wish you may let the demo counter count down, and the program will enter the demonstration mode. Entering a "D" at any time will END the program.

Don't get too close to the sides of the screen or you'll be

"shocked" by the results. Oh yes, ohe final warning—beware of the occasional lightning bolt which cannot be escaped!

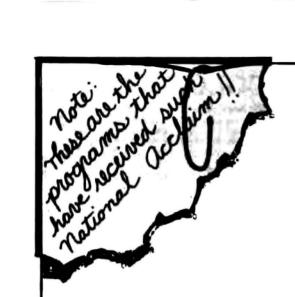
All of you BASIC programmers may feel free to use any of the subroutines from Parachite Jump in your own programs. In particular, you might take a close look at the scoring routine (lines 490-610). Have fun with Parachute Jump, and let us know here at JARB Inc. what you think of this contribution.

For those of you who may not wish to type the program in yourself, it is available on cassette from JARB Inc. for \$9.95 plus \$2.00 for shipping and handling.

The listing:

2 3 PARACHUTE JUMP BY JARB SOFTWARE (C) JARB SOFTWARE 1982 10 PMODE4: PCLS 2Ø DIMA(78), B(78), N\$(9), N(8Ø), A1 (4):HT=4Ø:M=1:DM=Ø:T=Ø 3Ø GOSUB660:FORI=1T031:PLAY"02V" +STR\$(I)+"T255GCAE":NEXT 4Ø CLS:PRINT@233, "PARACHUTE JUMP ":PRINTTAB(6)"(C) JARB SOFTWARE 1982": GOSUB690: GOSUB510 5Ø SCORE=Ø: DRIFT=RND(10)-5:H=128 : V=65 6Ø GOSUB47Ø:GOSUB49Ø 7Ø GOSUB75Ø 8Ø PMODE4: PCLS 90 DRAW"A0BM128,96U2L3H2U1D1F2R6

E2U1D1G2L3D3G2D2L2R2U2E2F2D2R2 100 CIRCLE(128,92),2:FORI=1T020: CIRCLE (128, 78), I, 1, .8, .5, 1: NEXT: FORI=108T0148STEP6:CIRCLE(I,78), 2.Ø: NEXT 110 LINE(110,78)-(123,93), PSET:L INE(116,78)-(123,93), PSET: LINE(1 23,78)-(123,93),PSET:LINE(128,78)-(123,93),PSET:LINE(128,78)-(13 3,93),PSET:LINE(133,78)-(133,93) ,PSET:LINE(140,78)-(133,93),PSET :LINE(146,78)-(133,93),PSET 120 GET (95,55) - (161,101), A, G:PCL 13Ø GOSUB1Ø3Ø 140 LINE (0, 22) - (255, 22), PSET 15Ø LINE(124, 189) - (132, 191), PSET BF: DRAW"AØBM9Ø, 191U8R2F3G3L2D2B R77U8L2G3F3R2" 16Ø GOSUB62Ø 170 DRAW"A"+STR\$(AN)+"BM218,6U5G 2E2F2" 18Ø IFSCORE<ØTHENDRAW"AØBM67,15R 5" 190 SCREEN1,0:GOSUB1070 200 IFDM=100THEN220 21Ø CIRCLE(128,5),2,1:CIRCLE(128 ,5),3,1:CIRCLE(128,5),2,0:CIRCLE (128,5),3,0:IF PEEK(65280)=127 O R PEEK (6528Ø) = 255 THEN 21Ø 22Ø PLAY"03V3ØT255EEADDDV2ØEEADD V1ØEEADDV3ØDDDDD" 23Ø IFDM=1ØØTHEN24ØELSE25Ø 24Ø GOSUB118Ø:GOTO28Ø 25Ø IFDF=3THENH=H+INT(JOYSTK(Ø)/ 1Ø)-3ELSEH=H+INT(JOYSTK(Ø)/6.3)-26Ø IFFDM=1ØØTHEN28Ø 27Ø V=V+INT(JDYSTK(1)/10)-1 28Ø A\$=INKEY\$: IFA\$="Q"THEN1Ø2Ø 290 H=H+DRIFT 300 IFH<35THEN460ELSEIFH>220THEN 460 31Ø PUT (H-33, V-41) - (H+33, V+5), A, PSET 32Ø LB=RND(1000): IFLB>=999THENGO SUB1090 33Ø IFV>9ØTHENGOSUB76Ø 34Ø PLAY"01V3ØT255L255B" 35Ø IFDF=3THENV=V+3ELSEV=V+2 36Ø IFV>=186THEN38Ø 37Ø GOT023Ø 38Ø H1=ABS(H-128) 39Ø SCORE=SCORE+(1ØØØ-(H1*1Ø)):L S=(1000-(H1*10))+SS:SS=0 400 IFLS=1000THEN410ELSE420 41Ø FORBONUS=1T03:PLAY"0"+STR\$(2 +BONUS) +"V3ØT8L8DEFFGBDDCCEAA": N EXT: GOTO45Ø 42Ø IFLS>95ØTHEN43ØELSE44Ø



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43Ø FORI=1T025STEP2:SOUNDI*1Ø,1: NEXT:GOT045Ø

44Ø SOUND1Ø,1:SOUND1ØØ,1:SOUND19 9,1:SOUND2ØØ,1:SOUND2Ø1,1:SOUND1 5Ø,4

45Ø HT=4Ø:DRIFT=RND(1Ø)-5:GOSUB4 7Ø:H=128:V=65:PCLS:GOSUB49Ø:GOSU B64Ø:GOSUB85Ø:Q=H+(RND(6)-3):GOT 014Ø

460 EW=EW+1:LS=-500:SCORE=SCORE-500:FOREL=1T015:SCREEN1,1:SCREEN

1,0:SOUND254,1:NEXT:GOT0450

47Ø IFDRIFT<ØTHENAN=3ELSEIFDRIFT >ØTHENAN=1ELSEAN=Ø

48Ø RETURN

49Ø GOSUB1Ø3Ø:FS\$=STR\$(SCORE):FO

RI=2TOLEN(FS\$):F1\$=MID\$(FS\$,I,1):P0\$="AØS4BM"+STR\$((I*10)+55)+".

19": DRAWPO\$+N\$ (VAL (F1\$)): NEXTI

500 RETURN

51Ø N\$(Ø)="U7R4D7L4"

52Ø N\$(1)="R4BL2U7L1G1"

53Ø N\$(2)="BR4L4U1E4U1H1L2G1"

54Ø N\$(3)="BU1F1R2E1U2H1L1E2U1L4

55Ø N\$(4)="BR4U7BD4L4U4"

56Ø N\$(5)="BU1F1R2E1U2H1L3U3R4"

57Ø N\$(6)="BU7D7R4U3L4"

58Ø N\$(7)="BU5U2R4D7"

59Ø N\$(8)="U7R4D3L4BR4D4L4"

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610 RETURN 620 IFDRIFT<0THEND9=DRIFT*-1ELSE D9=DRIFT

63Ø F\$=STR\$(D9):P\$="AØC1S4BM225, 9":DRAWP\$+N\$(VAL(F\$))+"BM235,9U4 F2E2D4BR4U4R2D2L2D2BR6U4D2R4U2D4 ":RETURN

640 IFLS<0THENMN\$="C4A0C1BM67,6R5"ELSEMN\$=""

45Ø LS\$=STR\$(LS):FORI=2TOLEN(LS\$):F2\$=MID\$(LS\$,I,1):P1\$="AØS4BM"+STR\$((I*1Ø)+55)+",9":DRAWMN\$+P1\$+N\$(VAL(F2\$)):NEXTI:RETURN

660 CLS:PRINT@201, "JARB SOFTWAR E":PRINT:PRINTTAB(12) "PRESENTS"

670 FORI=31T01STEP-1:PLAY"02V"+S TR\$(I)+"T255EDBF":NEXT

68Ø RETURN

690 FORTD=1T0800:NEXT:CLS:PRINT@ 224,"DO YOU WISH A DIFFICULT GAM E OR AN EASY GAME <D OR E>" 700 A\$=INKEY\$

71Ø T=T+1:PLAY"V3Ø01T255B":PRINT @165,"COUNT UNTIL DEMO =";(5ØØ-T):IFT>5ØØTHENDM=1ØØ:DF=5:T=Ø:GOT 073Ø

72Ø A\$=INKEY\$:IFA\$=""THEN71ØELSE IFA\$="D"THENDF=3ELSEIFA\$="E"THEN DF=5ELSEGOTO71Ø

73Ø CLS:PRINT@224, "THANKS...WE'L L START IN A SECOND"

74Ø RETURN

75Ø Q=H+(RND(6)-3):DRAW"C1A1BM12 8,96H2G2F2E2L4H2F2G2":GET(124,8Ø)-(132,97),A1,G:PCLS:RETURN

76Ø HT=HT+1Ø

770 IF Q<H THEN Q=Q+1 ELSE IF Q> H THEN Q=Q-1

78Ø IFHT>191THEN84Ø

790 IFPPOINT(Q,HT)<>0THEN800ELSE

800 IFHT<180THENSCORE=SCORE-1000:BC=BC+1:SS=-1000:GOTO830

810 PUT(Q-4,HT-16)-(Q+4,HT),A1,P SET

82Ø RETURN

83Ø PUT(Q-4,HT-16)-(Q+4,HT),A1,A ND:FORE=1TO2ØSTEP5:SOUND1,1:CIRC LE(Q,HT),E,1,1:NEXT:FORE=1TO2Ø:C IRCLE(Q,HT),E,Ø,1:NEXT:GOSUB88Ø: Q=H+(RND(6)-3):HT=4Ø:RETURN

84Ø PUT(Q-4, HT-16) - (Q+4, HT), A1, A ND:FORTD=1TO2:CIRCLE(Q, HT), 4, 1:P LAY"01V3ØT2ØØEV25EV2ØEV15EV1ØEV5 EV3ØB":CIRCLE(Q, HT), 4, Ø:NEXTTD:G OSUB88Ø:Q=H+(RND(6)-3):HT=4Ø:RET URN

85Ø IFBC<=ØORBC>3THEN86ØELSEFORT D=1 TO BC:DRAW"C1A1BM"+STR\$(21Ø+



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(TD*7))+",19H2G2F2E2L4H2F2G2":NE XT:RETURN 86Ø IFBC<=ØTHENRETURN 87Ø GOTO94Ø 88Ø IF V<HT THEN 93Ø ELSE GET(H-33,V-41)-(H+33,V+5),B,G 89Ø V=V+8:IFV>183THENRETURN 9ØØ PUT(H-33,V-41)-(H+33,V+5),B, PSET 91Ø PLAY"05V2ØT255EEEAAAEEE" 92Ø IFV<183THEN89Ø 93Ø RETURN 94Ø GOSUB111Ø:FORTD=1T05ØØ:NEXT:

940 GOSUB1110:FORTD=1T0500:NEXT: CLS:PRINT@32," FINAL GAME R ESULTS":PRINT@96, "TOTAL BOMB HIT S = "; BC:PRINT:PRINT" TOTAL SHO CKS = "; EW:PRINT:PRINT" FINAL SCORE = "; SCORE

95Ø PRINT@288, FE\$

960 PRINT:PRINT"DO YOU WISH TO P LAY AGAIN (Y/N)?"

970 PRINT@426, "PARACHUTE JUMP":P RINTTAB(6)"(C) JARB SOFTWARE 198 2"

98Ø A\$=INKEY\$

990 IFDM=100THEN1000ELSE1010

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(the arcade game)

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1000 FORTD=1T02000:NEXT:RUN 1010 AS=INKEYS: IFAS=""THEN1010EL SEIFA\$="Y"THENRUN 1020 CLS:PRINT@224, "THANKS ANYWA Y....BYE FOR NOW":FORI=1T05ØØ:NE XT:FORI=ØT019:CLS:PRINT@224+I."J ARB SOFTWARE";:FORTD=1T010:NEXTT D: NEXT: SOUND1, 1: FORI=19TOØSTEP-1 :CLS:PRINT@224+I, "JARB SOFTWARE" ;:FORTD=1T010:NEXTTD:NEXT:SOUND1 , 10: CLS: END 1030 A\$="AØBM1,18BR3U5L2R4BR3D5R 3U5L3BR6R4BL2D5BR5U5R3D5BU3L3BR6 U2D5R3BR6R3U3L3U2R3BR3R3BL3D5R3B R3U5R3D5L3BR6U5R3D2L3BR1F2D1BR3R 3BL3U3R2BL2U2R3 1040 B\$="BM9,8U5BD5R3BR3U5R3D2L2

1040 B\$="BM9,8U5BD5R3BR3U5R3D2L2 BR2D3BR3R3U3L3U2R3BR3R4BL2D5BR8R 3U3L3U2R3BR3R3BL3D5R3BR3U5R3D5L3 BR6U5R3D2L3BR1F2D1BR3R3BL3U3R2BL 2U2R3

1050 C\$="BM185,4D4F1E1U1D1F1E1U4 BR3D5BR3U5F2D1F2U5BR3D5R2E1U3H1L 2

1060 D\$="BM185,18U5D2R3U2D5BR4U5 BR3R4L2D5BR5R3U3L3U2R3

1070 DRAWA\$: DRAWC\$: DRAWB\$: DRAWD\$
1080 RETURN

1090 EW=EW+1

1100 L1=RND(255):L2=RND(255):L3= RND(255):FORTB=1TO4:LINE(0,24)-(L1,56),PSET:LINE-(L2,88),PSET:LI NE-(L3,115),PSET:LINE-(H,V),PSET :PLAY"01V30T255D":LINE-(L3,115), PRESET:LINE-(L2,88),PRESET:LINE-(L1,56),PRESET:LINE-(0,24),PRESE T:NEXT:SCORE=SCORE-1000:RETURN

1110 IFSCORE<=1000THENFE\$="BETTE R STICK TO WALKING"

1120 IFSCORE>1000ANDSCORE<=5000T HENFE\$="FAIR SKILL LEVEL, BUT NO T GREAT"

1130 IFSCORE>5000ANDSCORE<=10000 THENFE\$="GREAT SCORE, YOU HAVE P OTENTIAL"

1140 IFSCORE>10000ANDSCORE<=2000 0THENFE\$="EXCELLENT, YOU'RE READ Y TO ENTERCOMPETITION, AND MAYBE WIN TOO"

1150 IFSCORE>20000ANDSCORE<=3000 0THENFE\$="YOU SHOULD BE TEACHING SKYDIVING"

1160 IFSCORE>30000THENFE\$="YOUR PERFORMANCE IS UNEQUALED"

117Ø RETURN

1180 IF Q>V THEN V=V+1 ELSE V=V+

1190 IF HT>H THEN H=H+2 ELSE H=H -2

1200 RETURN



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Software Review ...

Worksaver Has Large Number Of Fine Features

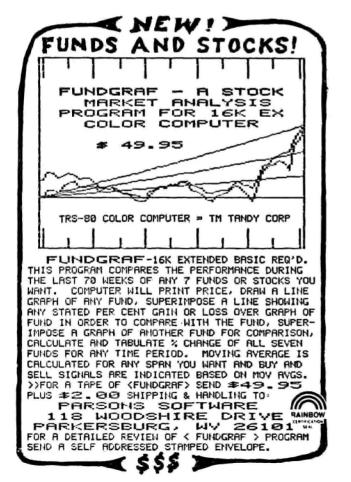
There are a number of products on the CoCo market that will provide automatic entry of keywords, auto line numbering and the like. Some of them are very good while others are only fair. But the *Worksaver* ranks up there with the best of them.

This fine utility is really a combination of keyword input and screen editing utilities. It has most of the features of both kinds of programs and, while the instruction set takes some getting used to, it does provide a great number of options for almost every use in the creation and editing of Basic programs.

Don't expect to sit down in one shot and understand all that is available with the *Worksaver*. It is just not possible. On the other hand, there are so many features that there is certainly something for everyone and for those who finally master all the commands, the program will perform yoemanlike service.

Accept as a given that the Worksaver will perform the "normal" things you expect from a program of this sort. Those things are full screen editing, two-stroke keywords (a control key and a letter key) and automatic line numbering. A short word about both should be sufficient.

This program has two control keys, CLEAR and BREAK. So, each key can be defined twice. For instance, pressing CLEAR and then the letter "R" will generate the keyword READ. If you press BREAK and the letter "R" instead, you get the keyword DATA. This means a large number of commands can be included on the keyboard.



As to the full screen editor, this will be a different experience for those of you used to Basic's line editor. Want to change the line a couple of lines up? Simple use the arrow keys to move the cursor to the appropriate place and make the change. This is not only a lot easier, it is vastly faster, too.

Having said that, it is important to bring in some of the enhancements afforded by the line editor. Simple things like changing line numbers, joining lines together, breaking them apart, duplicating them elsewhere. This is heady stuff—it is very easy to do with the Worksaver, yet offers some very powerful alternatives.

Before we forget it, you keep all this straight with a keyboard overlay. Truth: The Worksaver's overlay is the best we have seen for this type of program. It is light blue with colored keywords and the line—making it very easy to read (even though it is complicated at first glance).

Given all of those things, and they are pretty significant in themselves, we'll talk about some of the other things the Worksaver can handle.

One of the things which intrigued us the most is a capability called dynamic input. We liked dynamic input a lot for one simple reason: How many times have you, like us, had to input a numerical value that required an arithmatic expression, something like 25 plus 33? An input without the Worksaver required us to add that figure in our heads—with dynamic input, we merely enter the expression as "25+33." This works with strings as well.

Dynamic editing allows you to make corrections to programs without losing the value of variables and arrays while the program is running. This is a major plus in debugging, especially when, in writing a program, you have to load data from tape. It can save a lot of time in the data loads, alone—not to mention the generation of data through inputs.

The dynamic editing is not all-inclusive and there are some catches you will have to observe. For instance, if you encounter an error while in the middle of a data read, you will have to decide whether to RESTORE the data or not. Still, this is a most useful utility.

A third very useful element is a full screen array editor. Yes, we said an array editor. The *Worksaver* actually lets you enter items from tape into an array, edit the items in the array, and then save them back to tape. Nifty.

Oh yes, we should mention the use of a "numeric keypad" as part of the program. Several of the keys are redefined to be numbers along the lines of the keypads on the model II/16 and Model III. However, since the keys on a typewriter keyboard are offset somewhat, you do not have the true keypad effect necessary to get a great deal of benefit from this feature.

Documentation for the Worksaver comes in a booklet of 28 full-sized typeset pages. In addition, there is an addendum of two pages from a line printer. The authors have done a better-than-adequate job of explaining all the features of the program, including a number of good examples. A little better layout and consistancy of style would have been good, but, on the whole, the instructions are above average.

We were pleased with the quality and professionalism of the Worksaver. This is an excellent utility which will save you hours of programming time. The many capabilities make it appear complicated at first, but a little work with the Worksaver will save you hours of work in the writing and debugging of your own programs.

(Platinum Software, P.O. Box 833, Plattsburgh, NY 12901, \$30 plus \$3 s/h)

-John H. Tyler

"TRS-80 COLOR COMPUTER PRODUCTS" "THE 1248-EP EPROM PROGRAMMER"

The 1248-EP EPROM PROGRAMMER is a full function unit that is compatible with virtually all popular 1K, 2K, 4K & 8K -by-8, 24 pin, 5 volt EPROMS. Compatible devices are 2508's, 2758 -0/1's, 2516's, 2716's, 2532's, 68732-0/1's, 68764's, and 68766's. Components 2732, 2732A, 2564, and 2764 are compatible via adapters (not supplied). The programmer is totally menu driven by resident position independent firmware in EPROM, which makes it suitable for experienced computer operators and novices alike.

Select the device type to be programmed from the device menu. Next, select the function to be performed from the function menu. On your command the 1248-EP will verify EPROM erasure, compare EPROM contents to specified contents of RAM or ROM, program blocks or individual bytes of EPROM memory or copy an EPROM's contents to user specified RAM.

The 1248-EP plugs into the cartridge slot of the Color Computer and is invoked by the user with the "EXEC & HCOOO" BASIC command. The 1248-EP contains its own on-board programming power supply, and has a quality "Zero Insertion Force" socket.

The combination of the <u>TRS-80 Color Computer</u>, an editor/assembler/monitor such as the Micro Works SDS80C** and the 1248-EP EPROM programmer, makes a high performance, cost effective software development station for MC-6800/6809 microprocessor based systems. Use the system to store your own games or utility programs in EPROM's for execution from the cartridge slot using the CK4_PROM/RAM card described below.

The cost of the 1248-EP EPROM PROGRAMMER, instructions and adapter diagrams is just \$99.95.

"THE CK4 PROM/ROM CARD"

The CK4 works with 2K, 4K or 8K-by-8 ROM's or EPROM's of the 5 volt only variety in 24 pin packages. In addition, the CK4 may be used with 4 static RAM's such as 6116's to expand the computers memory work space by 8192 bytes. Each of the four on-board sockets can be decoded to any 2K block of the memory map from \$C000 through \$F800 of the Color Computer. In addition, each socket can be configured to respond to address blocks from 2K to 8K bytes in length, thus accommodating 2K, 4K or 8K-by-8 ROM's, EPROM's or RAM's. ROM and RAM can be mixed on the card as well. RAM, on the card, can be written to and then "write protected" via dip switches on the CK4 to emulate ROM.

The instructions include information on how to set up the socket decoding circuitry and how to provide battery backup for programs stored in CMOS static RAM on the CK4 with the computer off or the cartridge removed.

The popular CK4 PROM/RAM card is now available in three versions.

- 1) The full featured CK4 remains the standard of cartridge board flexibility with the added capability of providing battery backup for CMOS static RAM's such as 6116's. Cost of the CK4 is still just \$29.95.
- 2) The CK4-1 is a ROM only version of the CK4 card for use with CoCo's with later than "E series" circuit boards. These later versions of CoCo are not able to write to cartridge based RAM without modification. Cost is \$27.95 for the CK4-1.
- 3) The CK4-2 is the unpopulated CK4 series circuit board only. Buy this version of the CK4 and configure them to meet your specific requirements at a price designed to stretch your dollars value. Cost is \$15.95 each.

"MORSE ENCODER/DECODER KIT"

The MEDK80 Morse En/Decoder Kit consists of a machine code software driver on tape, a schematic diagram of the interface circuitry, component parts, a printed circuit board (PCB), packaging suggestions and complete instructions for building a Morse code transmission and reception system that is compatible with 4K RAM and up models of the TRS-80 Color Computer.

The transmitter/receiver interface circuitry is totally optically isolated and is, therefore, compatible with all receivers and transmitters. Transmitter and receiver both connect to the interface unit and to the Color Computer via the RS-232 port.

The MEDK80 Morse En/Decoder kit operates at speeds up to 70 words per minute and automatically adapts to speed variations of the sender. When transmitting, words are transmitted only when fully formed, i.e., followed by a space, and the transmit text buffer gives visual notification to the operator of what word/character is currently being sent. In addition, the text buffer is 512 characters deep, which is sufficiently large to keep up with the best of "ragchewers"

Potential purchasers of this product should have previous kit building experience. However, this is not a kit of great complexity, and is well within the abilities of those actively involved in amateur radio or electronic hobbies to construct. To reduce the chance of wiring errors, component placement is indicated on the PCB and detailed assembly instructions are included.

The cost of the MEDK80 software, parts, and instructions is \$39.95.

"COCO" GETS A BREADBOARD

The COCO BREADBOARD is a circuit board that plugs directly into the cartridge slot of the Color Computer and provides the user with 16 square inches of predrilled breadboarding area for circuit development, interfacing experiments, motherboard implementation, or whatever your imagination conjures up. The plated thru holes in the breadboard are wirewrap pin compatible and on 0.10 inch centers.

The COCO BREAD BOARD brings all of the data, address, and control signals available at the cartridge slot outside of the body of the computer and the signal lines are appropriately labeled to facilitate error free wiring of breadboards. A ground plane is provided on the top side of the board and solder pads are provided on the bottom of the board, thus facilitating circuit grounding and point-to-point wiring. In short, the COCO BREADBOARD was designed with the experimenter in mind.

The COCO BREADBOARD is attractively priced to justify its use for even the lowest budget projects. It is an ideal vehicle for learning interfacing techniques. Buy extras to have on hand for those rainy weekends.

The COCO BREADBOARD costs just \$19.95, Price for two (2) or more is \$16.95 each.

FACTORY FRESH COMPONENTS:

ITEM	DESCRIPTION	PRICE
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2532 EPROM	4K by 8 bit, 350 ns	\$6.50 ea.
6821P	P.LA.	\$3.50 ea.
74LS156	Open collector decoder	\$1.70 ea.
Socket	ZIF, 24 pin, Aries	\$7.95 ea.

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Software Review ...

Game Writer Is An Excellent Utility For CoCo

Do we call this a game or a utility? We are not really sure, but Game Writer is an excellent program that will provide a great deal of enjoyment and has the advantage of being fun in both the creating and "final result" aspect of things as well.

For these purposes, I suppose that Game Writer is a utility. After all, it does create things—or allow CoCo to do things which it otherwise could not do. Is that the definition of a utility? I suppose so.

If you want to do some game writing, and have the advantages of high speed in an almost-assembled format, then Game Writer will help a lot. The program is supplied in a ROM Cart that plugs into the expansion port and from the time that you turn the computer on, you are working within the Game Writer system.

There are three modes of operation for the program. The first, Control, lets you access the two other modes, permits

loading and saving to and from tape and enables you to print out your programs. The second, Run, lets you run programs.

But the fun begins in Edit Mode. That is where you create programs. Once a program is created, you exit it and go to Run Mode to run. Not as complicated as it sounds. It is a simple process of pushing two button's on the keyboard.

Game Writer reminds us a great deal of the LOGO language. That is no surprise, since the author who developed it also developed Color LOGO for Radio Shack (see a review on Color LOGO elsewhere in this month's Rainbow). And, Game Writer has all the advantages of LOGO, high speed, graphics orientation and an easy-to-use language.

Our opinion is that the easiest-to-use part of this program is the most difficult in BASIC, the drawing of figures to be used in games. The program allows you to define shapes in a 16 by 16 grid—and all you do is draw that grid with periods and X's. Where there is an X, the pixel in your figure will be set to "on," a period will have it "off." Using the instructions which come with Game Writer, I drew a complicated little space invader-like creature in about a minute, and then modified it in 30 seconds!

Once you have defined a shape, you can move it about the screen using commands very much like those in LOGO—foward, backward, right turn, left turn, set heading and so on. An additional neat feature allows you to decide whether the object will "wrap" from one side of the screen to the other if it goes off the edge, bounce off the side of the screen or just disappear if it hits the edge.

You can define up to 15 shapes in Game Writer, but each shape can be used more than one time. And, the shapes can "communicate" with each other—which essentially means

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you can let them interact.

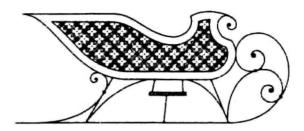
There is a good set of commands for operation of games as well—IF, ELSE, LOOP and WHILE. You can control movement very well with these commands, and the ones which allow you to create variables and perform relational operations between them (as in Basic). You can also print characters on the screen, control the colors of the shapes and the background and the like. All in all, a very complete list of things that can be done with games.

But what is a game without sound? Not much, so Game Writer provides 26 different levels of sound (accessed by single letters) at variable durations. These are some of the best easy-to-produce sounds we have heard for CoCo.

With all of this at your disposal, you would expect that there is a lot to learn. There is. But Game Writer comes with a 39-page instruction book that explains things very well and is even three-hole punched for your convenience. The documentation is clear and includes a number of examples which you can type in and run.

For those of you interested in making your own games, Game Writer will be a valuable purchase. In our view, the only drawback at this time is that most of the games you create will have to be your own—in other words, until this system catches on (which it should do), there will probably not be much commercial software available for the Game Writer system. But, Game Writer does provide a way to create graphic games simply and quickly—and you will have fun making them as well as playing them.

(Washington Computer Services, 3028 Silvern Lane, Bellingham, WA 98226, \$129 plus \$5 s/h)



Graphic Traffic

Here's a little program we think you'll enjoy playing. It was sent to us by John Dana of Hamden, Connecticut, and can give your CoCo vertigo in just a few seconds.

Try typing in your name, and then pecking away at the space bar. You'll be amused—even as your head begins to swim.

As John points out, these effects can be incorporated into games for displays, and when a desirable combination is found, it can be preserved in string or data statements.

Enjoy this.

5 CLEAR 100

10 AS=INKEYS

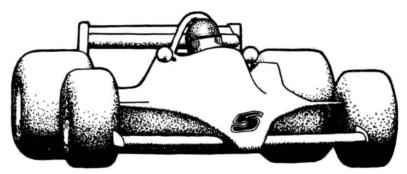
20 B\$=B\$+A\$

30 PRINT BS:

40 GOTO 10



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Format Your LLISTings With FLIST

by Charles J. Roslund Rainbow Contributing Editor

(Mr. Roslund is the author of War Kings, Intergalactic Force and many machine language utilities for the 80 C.)

Have you ever wished that your program listings (on your printer) would skip over the page perforations and maybe format the listing a little? There are several good utilities on the market that will do this formatting for you, but all the ones I've seen require that you first save the program in ASCII format to create a data file that the formattor reads. This may get to be a bit inconvenient (especially if you don't have a disk based system). This month's program will automatically skip over page perforations and format the printed listing without requiring you to make an ASCII save of the program. I call this program FLIST. It provides a machine language driver that formats the output to the printer when you load a Basic program and enter the comand LLIST. You can't get much simpler than that.

To use FLIST, once you get a copy of the accompanying

program on tape or disk, just follow these steps.

1. LOADM"FLIST" as you would any other machine language program. FLIST is written in position independent code so it may be loaded with an offset to keep it out of the way of the Basic program you wish to list. The listing shows FLIST located as \$0 E00 which is the beginning of the first Graphics page on Disk based systems. \$0 E00 is in the second Graphics page on Extended Basic Computers, and this is a safe place for it as long as you don't execute a

ALL OF US HERE AT PRICKLY-PEAR SOFTWARE: Bill and Sara Nolan Daniel and Nathan Nolan Paul and Susan Petrocci Steve Hrometz Keith Dickinson David Hunt David Yarbrough Hazzard and Nipper (the Dogs) Poco Diablo (the Ferret) Taffy (the Cat) Lightfoot (the Rat) and Francis (the Turtle) wish you and yours a joyous, safe, and peaceful holiday season. May the spirit of this season become a permanent part of all your lives

PCLEAR1 command while you are using FLIST. Color Basic users will probably want to reserve high memory for FLIST and offset load it. For example: CLEAR200, 15800 to reserve high memory and CLOADM"FLIST," 12300 would load FLIST into the reserved memory area. Note, these numbers are for a 16K Color Basic Computer and they waste a few hundred bytes of memory, but they are nice, round, easy-to-remember numbers.

2. After loading FLIST, EXECute it. This will perform

some initialization and then return to Basic.

 Next, if your Basic program is already in memory, just enter the standard Basic command LLIST. If your Basic program is not in memory, you must load it and enter LLIST.

4. Watch the formatted program listing appear on your printer. If you wish to list several programs, you must EXECute before each listing to zero the page counter. You must also manually advance the paper to a few lines down from the "Top of Form" after each listing.

FLIST provides the following formatting features:

- 1. 60 lines per page with six blank lines between pages.
- 2. Breaks each line at 75 columns to leave a right margin.
- Indents continuation lines so that only line numbers are in the left-most columns.

Note, all of the above features are redefinable and I'll describe how to change them while I'm describing how the program works.

PROGRAM INITIALIZATION

Lines 3 through 12 (refer to program listing for all line number references) perform the initialization for FLIST. This initialization is similar to that used in the last month's SCROLL PROTECT program. The same ROM TRAP is used at address \$0168. This is the address that is vectored through every time a character is printed to any device (screen, printer, cassette, etc.) The "A" register contains the character to be printed when \$0167, which will contain a "JMP" instruction. The address jumped to is at \$0168.) Line 3 (CLR LINCNT, PCR) zero's the location labeled LINCNT. This is the line counter used to count carrage returns, which is actually counting lines on a page. Lines 4 and 5 save the old contents of \$0168 in OLDVEC. Lines 6 and 7 install the new vector, NEWVEC, in \$0168. This will cause the ROM routine that is printing a character, to execute the program starting at NEWVEC before printing the character. Lines 8 and 9 install a "JMP" instruction at \$0167. This may sound unnecessary since I already stated that \$0167 contains a "JMP" instruction. Well, it is unnecessary if you have EXTENDED or DISK Basic. The EXTENDED and DISK Basic ROMS install a "JMP" at \$0167 during their initialization of the computer. If you have regular COLOR Basic, \$0167 will contain a "RTS" instruction, and installing this "JMP" instruction is necessary. Lines 10 and 11 put an "RTS" instruction at the label START. This assures that the initialization routine will move the vector at \$0168 only one time (the first time it's executed). Every time it's executed thereafter, it will only zero the line counter (line 3) and then return. This allows you to zero the line counter after one listing is complete, to do another listing, if you desire. This is accomplished by merely EXECuting FLIST again. Line 12 returns from the initialization routine. Control is returned to Basic, and you will see the "OK" prompt.

SYMBOL DEFINITION

Lines 13 and 14 EQUate two symbols to ROM addresses. PRNT is the address of Basic's print to the printer subroutine. Whatever is in the "A" register is printed when this subroutine is called. PRTCOL is the address of Basic's printer column counter. This location counts the number of

characters printed to the printer since the last carrage return. Lines 15 and 16 reserve memory for OLDVEC, where I will save the original contents of the vector at \$0168, and LINCNT, which is used to store the number of carrage returns (number of lines) sent to the printer.

MAIN PROGRAM BODY

The program starting at line 17 (NEWVEC) is executed every time a character is printed to any device. Lines 17 through 22 save the important registers on the stack, and check if the current character is going to the printer (this is determined by checking if \$6F contains a -2). If the current character is going to the printer, you branch to CHKCR, otherwise the program pulls all registers that were saved and returns to the Basic print routine by JUMPing to the address stored in OLDVEC.

Lines 23 through 26 check if the current character (in the "A" register) is a carrage return. If it is, the line counter is incremented, and the program returns to the ROM print routine by branching to RETURN. If the current character is not a carrage return, the program branches to CHKCOL (check column number). Lines 27 through 37 limit each line of the listing to 75 characters. Lines 27 and 28 compare PRTCOL with the number 75. If PRTCOL is less than 75, the program branches to CHKLIN (check line number). Otherwise, in linesx 30 through 36, a carrage return is sent to the printer, followed by four spaces to indent the next line of the listing. If you wish to change the column width of the

listing, you may change the #75 in line 28 to any desired column width. If you wish to change the number of spaces that continuation lines are indented by, change the loop counter in line 33 (now a #4) to any desired value. After the four spaces are sent, line 37 increments the line counter (LINCNT). The program then continues with CHKLIN at line 38.

Lines 38 through 47 check if 60 lines have been printed. If the line counter is less than 60, line 40 branches to RETURN to return to the ROM print routine. If 60 lines have been printed, lines 41 through 45 send 6 carrage returns to the printer to skip over the upcoming end of page. Then line 46 clears the line counter for a new page, and line 47 branches to RETURN. If you wish to change the number of lines per page you may modify the #60 in line 39 to be as many lines as you want printed on a page, and also modify the loop counter in line 41 (now #6) to be equal to the form length of your paper (usually 66) minus the number on line 39.

One important modification required for regular COLOR Basic users is: Change the three bytes in line 22 to "RTS" (\$39, \$39, \$39) since there is no OLD VECTOR to jump to in COLOR Basic computers. You just return to the Rom with an "RTS" instruction.

I use FLIST for just about every program listing since it's so quick to use, I would suggest that you save a copy of FLIST (located in a covenient reserved area of RAM) so that you can load it without an offset. This will make its use easier and faster.

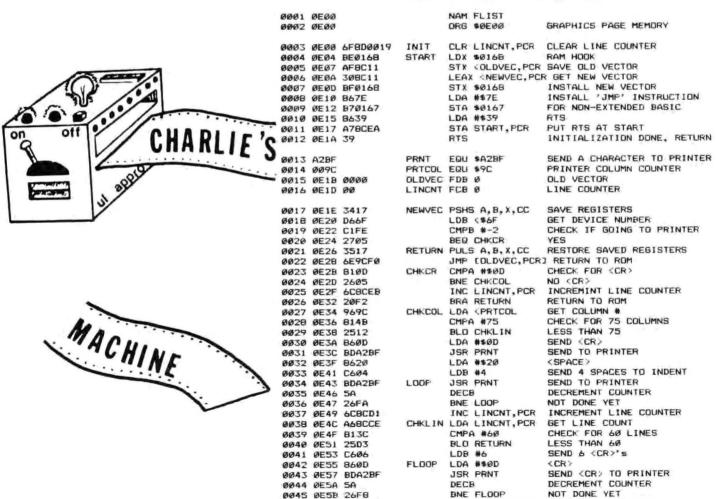
FLIST

CLR LINCHT, PCR

BRA RETURN

END INIT

CLEAR LINE COUNTER



0046 0E5D 6F8C8D 0047 0E60 20C4

0048 0E62

Software Review ...

Logo As A Language Children Can Understand

By David Hunt

When Seymour Papert set out to develop a language that would provide a computer based learning environment, he drew heavily on the theoretical influence of Jean Piaget, a recently deceased Swiss Child Psychologist under whom he studied for many years.

The result of his efforts was LOGO, an interactive, procedure-based language which is easy enough to be used by pre-school children, yet flexible enough to provide challenges for even the most advanced learners.

Perhaps the greatest difference between LOGO and other computer languages is seen in the way LOGO reflects its author's philosophy. Papert believes strongly that peoplechildren in particular-should control computers, not the reverse. He feels that most computers place learners in a position of inferiority to themselves. Standard drill, test and practice programs, for example, tell children when are are right or wrong. They never know more than the computer and are even told that computers never make mistkes—only people do that! LOGO puts the shoe on the other foot. For example, when told to "SQUARE" (without previous programming), the computer responds with "I DON'T KNOW HOW TO SQUARE." Now it's the computer that is dumb! Obviously the child is smarter than the computer, for s/he can easily "teach" the machine how to "SQUARE" by writing a short program and naming it "SQUARE."

Since LOGO is an interactive language, programs, known

as PROCEDURES, may be executed immediately, without having to be compiled. Procedural statements are translated by means of the computer's interpreter into machine code which it then executes. In this way, it is the same as BASIC. Debugging is accomplished very easily by modifying single statements or program lines which may be immediately tested, again as in BASIC.

TRS COLOR LOGO

COLOR LOGO utilizes four different modes—BREAK, RUN, EDIT and DOODLE.

Upon execution, the user finds himself in the BREAK mode, from which he may enter the EDIT mode or RUN mode by pressing (E) or (R) respectively. Pressing (S) or (L) will allow (S)aving programs in memory or (L)oading programs from tape or disk.

In the RUN mode, the user can control the motion and direction of a small figure on the CRT called a "turtle." Hence, the name "turtle graphics." Basically, the turtle may be directed anywhere on the screen by commands, such as FORWARD and BACKWARD, with specific distances, or, LEFT TURN and RIGHT TURN with specified degrees of rotation.

Abbreviations, such as FD, BK, RT and LT may be used. The turtle drags his tail, as it were, leaving tracks indicating where he has been, thus producing a graphic design on the screen. Other commands, such as PENUP (PU) and PENDOWN (PD) may be used to control the designs by determining whether or not the turtle leaves a trail. (I wonder why they didn't use "TAILUP" and TAILDOWN?") In addition, two color-sets are available. Within each color set there are four colors. The PENCOLOR (PC) and BACKGROUND COLOR (BG)

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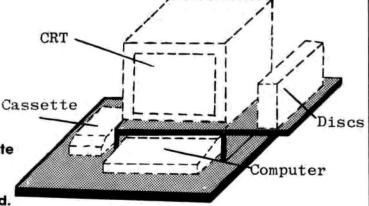
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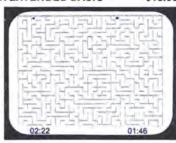
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- SCREEN PRINT will produce a regular size print. The image may be located anywhere on a page.
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may be changed at any time. Portions of a drawing may be erased by setting the pen color to the background color and drawing over the lines.

So far, what we have discussed describes the RUN mode in much the same way as the IMMEDIATE mode of BASIC. Commands are executed as soon as ENTER is pressed. Procedures which have been written and saved in the EDIT mode may also be executed in the RUN mode.

In the EDIT mode, procedures and subprocedures may be written and stored to be later executed in the RUN mode. Procedures are given titles preceded by the word "TO." for example, following is a procedure for drawing a square:

TO SQUARE

FD 40 RT 90 FD 40 RT 90

FD 40 RT 90 FD 40 RT 90

END

When the word "SQUARE" is typed in the RUN mode, a 40 unit square will be drawn by the turtle from the HOME (center of the screen) position. The use of the command REPEAT reduces the SQUARE procedure to:

TO SQUARE

REPEAT 4 (FD 40 RT 90)

END

The starting position of any graphic may be changed by the commands SETX (SX) and SETY (SY) followed by screen position coordinates. In addition, the heading of the turtle may also be modified by the command SETHEADING (SH), followed by a number of degrees of rotation. If the values used in any graphic are too large, or if the turtle is too close to the edge of the screen, wraparound will occur unless NOWRAP is specified. The user may even determine whether or not the turtle is visible by using the commands SHOWTURTLE and HIDETURTLE. The command CLEAR clears the screen.

Procedures written and stored in the EDIT mode may be modified by a full screen editor somewhat similar to those used by Apple and Commodore BASIC.

The final mode available is DOODLE. This mode, entered from the RUN mode by pressing "@," allows the

user to draw directly on the screen using single key entry strokes. A keyboard overlay is provided for the top row of keys. In this mode, the top row of keys operates the same way as INKEY\$ in COLOR BASIC, CLEAR, HOME, PENUP, PENDOWN, RT 45, LT 45, FD 1, FD 10, RT 15, LT 15 are performed with a single stroke of the keys 1 - 0, respectively. These moves are also symbolically shown at the bottom of the screen. When the BREAK mode is entered. the sequence of keystrokes used in doodling is automatically recorded as a procedure by a name given prior to doodling. This procedure may be seen and edited in the EDIT mode and executed by title in the RUN mode. If you don't mind giving up the ability to store and edit the drawings created in DOODLE, an open-ended one-key (OK) set of commands may be designed as single-key entry procedures. (Pressing ENTER, however, will now be necessary.)

PROBLEM SOLVING

The value of LOGO in problem solving becomes readily apparent when larger problems are broken down into smaller procedures.

LOGO's power is unleashed when procedures are combined. Once a procedure has been defined and named, it may be "called" to perform in another procedure. For example, a four-paned window can be easily constructed by repeating the SQUARE procedure.

TO WINDOW

REPEAT 4 (SQUARE LT 90)

END

Entering the command WINDOW in the RUN mode calls up the window procedure which in turn calls up the SQUARE procedure. The technique of using a procedure in defining another procedure is called RECURSION. Procedures may even call themselves!

COLOR LOGO's allowance of subprocedures facilitates the solution of complex problems, especially when the solution indicates repetitive action. Students learn to look for patterns which may be broken down and defined by short procedures. Logical thinking skills are developed and reinforced through problem solving of this type.

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OTHER FEATURES

COLOR LOGO provides for simple program saving to tape or disk in the disk version. The ROMPAC and tape version, however, will only provide for saving to tape. A disk for saving COLOR LOGO programs is divided into 16 modules of approximately 9K each. The modules are designated by the letters A-P. An index of procedures saved should be made because the disk directory is not used. COLOR LOGO also provides for easy output to a printer in single or double spacing format.

IN ADDITION:

* Multiple turtles (up to 255) may be created and given procedures to perform by the HATCH command.

* The turtle shape may be modified by means of the SHAPE command.

* The command SLOW puts turtle graphics in slow-motion at user-definable speeds.

* Messages may be sent between turtles using the SEND command (messages are numbers in the -32768 to 32767 range)

* Arithmetic (+, -, *, /), logical (and, or, not), and relational (greater than, less than and equals) operators may be used in procedures as well as variables (designated by a colon followed by a word of any length).

On the negative side, COLOR LOGO does not support any string or list-manipulating words. Outside of turtle graphics, there is little that is offered the more advanced programmer. There is no SPRITE mode which would allow three-dimensional graphics. Also, multiple commands may not appear in a single line in the RUN mode.

Another disadvantage is that the turtle on the screen can only turn in 45 degree increments. It can move and draw in increments which are smaller, but the user cannot necessarily tell by looking at the screen where the turtle will go. In addition, because COLOR LOGO uses only integer arithmetic, some jfigures (e.g., circles) are not drawn in the way you might think most logical.

The primary reason for some of these deficiencies is obviously the memory limitation of the COLOR COMPUTER, hardly something for which we can hold the authors of COLOR LOGO accountable. Nevertheless, programmers familiar with other versions of LOGO may well be disappointed with this limited version

CONCLUSION

In conclusion, COLOR LOGO is a fine, but admittedly limited implementation of the LOGO language. It is faithful to Papert's philosophy of encouraging inquiry and discovery. Children, as well as adults, using this language will learn through logical experimentation (I even learned a great deal through illogical experimentation!) with a feeling

that they are in control.

One final note. This review is based on a preliminary version of COLOR LOGO. However, it is unlikely that any major modifications will be made prior to its release.



Hardware Review ...

Improve Your Memory With This Handy Kit

Got 32K desire and only 16K capability? If that's the case, then this upgrade kit from JARB software could solve your dilemma.

I'm not an expert on IC's and circuit boards, nor soldering techniques, yet I did find this kit fairly easy to install. This was in no small part due to the detailed step by step instructions provided with the kit.

To start with, the eight RAM chips and the SAM chip must be removed from the computer. An IC removal tool is recommended, but I managed to do it with a nail file without any problems. Piggy-back chips with a pre-soldered connecting wire are then placed in the same sockets. Now, the connecting wires from each of these new chips must be joined. This is accomplished by soldering all nine connecting wires to the separate bus wire. Once that's completed (it's the trickiest part) the original chips are re-installed into the sockets of the piggy-back chips. That's it! 32K at a reasonable cost.

All in all, it took about 45 minutes to complete the process with no hitches. It's also good to know that no permanent connections are made to the computer so if removal is ever required, it can be done quickly and easily.

One final note. If messing around inside your computer with a soldering iron makes you nervous, or if your warranty has not expired, then stay away from this kit. It does require some skill and, as you may know, heat or static electricity can ruin a chip.

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-Robert D. Nunziato Jr.

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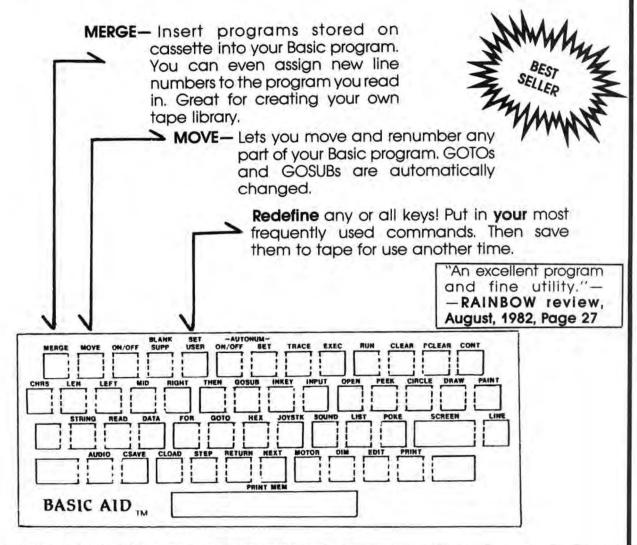
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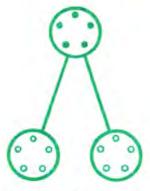
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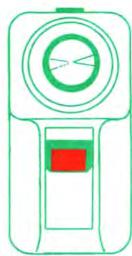
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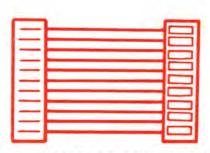


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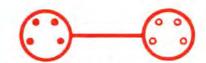


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ARE THERE MORE Color Computers coming? It looks like it. This page was the first to report about the TDP-100 and the Dragon-32, and now we give you the Sampo Color Computer from the far east. It is our understanding that this new piece of hardware-which is said to be compatible with CoCo-will have a Model III-like keyboard, four special function keys and a number of other things. Among them: A "port" on one side that has a telephone-looking plug. Could there be a built-in modem? We don't know, but we'll keep you informed.

By the way, the reason we keep telling you all about these new Color Computers is simply because they mean a bigger hardware and software base for CoCo. As we understand it, all the machines we are talking about will run Color Basic and Extended Color Basic programs. Some programs will require modification to run machine language, but that is another story. And, it means as more CoCos and CoCo-like computers are sold worldwide, there will be more and more people writing software for our own machine.

SPEAKING OF WORLDWIDE, the Rainbow was one of the attractions in the "Business To Business" show in Bellview, Manchester, England in November. This is one of the bigger computer shows in the United Kingdom. And, it is the beginning of a big push for the Rainbow in the U.K. and Europe. Did you note the additional price on the cover of this month's issue, £1.95?

ONE OF THE MORE interesting things we have seen is a number of hardware-type mods using the ROM port. First in is one from General Automation, but more are said to be ready soon. We expect this type of thing will be big for our CoCo in 1983. So, watch for a number of them.

ONE OF THE MOST IN-NOVATIVE displays we have seen in the CoCo world is a new one recently unveiled by Anteco. Its a counter-top display that is in the shape of a Color Computer, with the red break key and all. Shrink-wrapped programs are in

boxes where the monitor screen is on most of our units. Done up in three colors, it is very attractive.

WE'RE REALLY SORRY that we messed one up again and printed a credit to the wrong program that produced last month's cover for the Rainbow. We said a new program called Foxy Graf being marketed by Computerware was the means by which the cover was created. Oops. The program is marketed by Computerware, but its name is Semi-Draw (see a review in this issue). Our face is doublered because the program's very creative author, Paul Hoffman, will be doing an in-depth article on using Radio Shack's new X-Pad for next month's issue. Sorry Paul. Sorry Computerware.

RUMOR HAS IT THAT there are a lot of video game fans among CoCo owners. If so, there is a Video Game Lover's Calendar available from Chattanooga Choo-Choo Software (P.O. Box 15892, Chattanooga, TN 37415). Its \$4.95 and has a number of cartoons and the like on video game themes which will keep you chuckling all through 1983.

PHONING SOUTHERN CALIFORNIA for a quick pre-Holiday software or hardware order? If so, you might wish to check with your telephone operator before making a direct dial call. An area of the 714 area code has been changed to area code 619. So far, the Microworks, Cognitec and Jarb Software report that their area code numbers have been changed. Both 714 and 619 are supposed to work for a couple of months yet. But, if you run into trouble the area code change might be the reason.

Speaking of Jarb Software, they are among those with a "moving experience" this month. New address is 1636 D Avenue-Suite C, National City, CA 92050. The new phone is (619) 474-6213. Snake Mountain Software also reports a new address at 608 W. Johnson Street, Raleigh, NC 27603.

MID-AMERICANS CAN now dial up a new bulletin Board located in the heartland, Kansas City. Steve Odneal is

the system operator for this new service, called the "Mid-America Color Computer Network. It can be reached by calling (816) 358-6222 and is on-line 24 hours a day.

* * * * *

TEACHERS AND EDUCATORS will want to be aware of the Tandy TRS-80 Educational Grants program. It is designed to encourage and support the successful application of microcomputer technology in educational institutions throughout the United States. In all, Tandy will make some \$500,000 worth of hardware, software and firmware available to educational institutions through its grants program. Deadline for the next program-which uses "Unique and Innovative Microcomputer Applications in Education" as its theme-is March 31, 1983. Those interested can write to the Radio Shack Educational Grands Program, 400 Tandy Atrium, Ft. Worth, TX 76102.

While on the subject of education, we know of many people who think one of the major focuses of CoCo in 1983 will be in the educational field. The Rainbow is, of course, running its Education Notes programming column under the award-winning authorship of Steve Blyn. But, we hope you have noticed a second feature in recent months, from Dr. Paul Kimmelman, a highly-respected educational administrator, who is addressing ways in which faculty and administration can bring more microcomputers to the classroom.

WE HEAR THAT A 64K upgrade of a TDP-100 is even more simple than is the "E" Board upgrade. Bob Rosen of Spectrum Projects says that all you need to do to perform the upgrade is move two jumpers to the left of U21 and another above U28. Another jumper must be added, to the left of U17. Then, if you remove capacitors C58, C60, C62, C64, C66, C68, C70 and C72 you will have 64K. But, please, don't try any of these upgrades yourself unless you know quite a bit about electronics and have some ability in this area.

IF YOU ARE INTERESTED in the Unix operating system, or the C language, you might check out Uni-Ops (P.O. Box 5182, Walnut Creek, CA 94596-1182) for a list of courses. This not-for-profit firm has an eight-page catalog of short courses available.

LOSING BATTLES WITH A GLOOMSTICK?

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SPECTRUM STICK

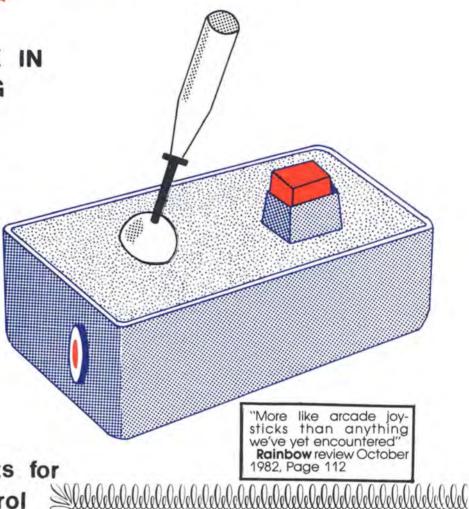
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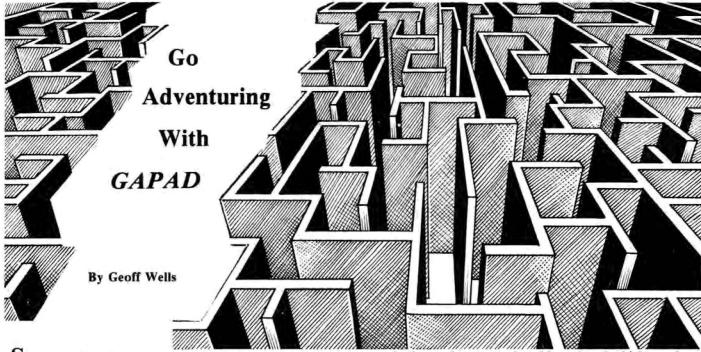
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So, you enjoy adventure games. In fact, you like them so much you would like to write your own. You're brimming with creative ideas, but unfortunately you don't know how to put them into proper form. If the assumptions we've made so far are correct, then you will most likely profit by reading the three-article series, of which this is the first part.

Over the next several months, we plan to show you how to create your own exciting adventure programs in only a few hours. This month we present *GAPAD* the general all-purpose adventure driver which, as the name suggests, can be the basis for all your original adventure ideas. Next month we will tell you how to plug your own scenario into the drivers data statements, and the following month we will publish the data for a completed original adventure.

The program as listed below will obviously not run as is, but you should type it in and save it in this form so that you can use it as a base for your own creations.

About the only changes you will make to *GAPAD* are the values in the FOR NEXT loops. This is because the basic structure of most adventures is the same, only the location descriptions and stuff you collect changes. All this information is read by the program from the data that you supply. After you have saved the program as printed, load it back in and make the changes listed below. These changes will allow you to run the program and check for any typing errors.

While you're waiting for next month's issue, you can start writing your own adventure. You must decide on the location, things to find and what a player must do in order to win. To design the map of the area to play on you will find it helpful to use 4" X 5" cards, one for each room or area. That way you can chance the design around without re-drawing a complete map. Lay out each card as follows:

X= Y= LOCATION DESCRIPTION: POSSIBLE DIRECTIONS: VISIBLE OBJECTS: OBJECT KEY WORD: COMMENTS:

You will also need a list of the first words you want to recognize (get, drop, open, read, etc.). Possible second

words (lamp, door, sword, gold, etc.) and which words go together. For example, if your adventure has a river you would not "get river" but you would "get lamp" or "swim river."

The listing:

```
Ø 'GAPAD**GENERAL ALL PURPOSE AD VENTURE DRIVER**
```

16K

ECB

1 'GEOFF WELLS

2 '21-12 EAST AVE N.

3 'HAMILTON-ONTARIO

4 'CANADA-L8L 5H2

5 '(416) 529-1319

6 'SPRING 1982

7 CLEAR500: ADD MACHINE ADDRESS

8 'DEFINE USR

10 DIMMC\$(XX,YY), IN\$(%%),FW\$(40),SW\$(##),FC\$(40),SC\$(##),DL(\$\$,1

), DD\$(\$\$), DK\$(\$\$)

2Ø FORNF=1TO2: IN\$(%%)="*": NEXTNF

30 FORNF=1TO++: READDUMMY\$: NEXTNF

4Ø FORNF=1TO4Ø:READFW\$(NF),FC\$(N

F): NEXTNF

56 FORNF=1TO##: READSW\$ (NF), SC\$ (N

F): NEXTNF

60 FORX=1TOXX:FORY=1TOYY:READMC\$

(X,Y):NEXTY,X

70 FORNF=1TO\$\$:READOL(NF,0),OL(N F,1),OD\$(NF),OK\$(NF):NEXTNF

80 'READ & POKE MACHINE LANGUAGE DATA

9Ø X=1:Y=1

100 D\$=MID\$(MC\$(X,Y),1,6):L1=VAL (MID\$(MC\$(X,Y),7,2)):L2=VAL(MID\$

(MC\$(X,Y),9,2)):L3=VAL(MID\$(MC\$(X,Y),11,2)):L4=VAL(MID\$(MC\$(X,Y)

,13,2))

110 RESTORE:L\$=""

120 FORNF=1TO&&: READDUMMY\$: IFL1=
NF THENL\$=DUMMY\$: NEXTNF ELSENEXT

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10-1102	Paper 4% inch (3 rolls) for						
10-1131	Paper 9½ inch - Line Printe						
10-1132	Ribbon - Line Printer I						
10-1151	Diskette 51/4 inch						
10-1200	RS Joystick						
10-1210	Computer Dust Cover						
10-1251	Computer Cassette Tape (10 Minute) CT-10						
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13Ø FORNF=1TO>>: READDUMMY\$: IFL2= NF THENL\$=L\$+DUMMY\$: NEXTNF ELSEN EXTNF

140 FORNF=1TO^^: READDUMMY\$: IFL3= NF THENL\$=L\$+DUMMY\$: NEXTNF ELSEN EXTNF

150 FORNF=1TO@@:READDUMMY\$: IFL4= NF THENLS=LS+DUMMYS: NEXTNF ELSEN EXTNF

160 OB\$="":FORNF=1TO\$\$:IFOL(NF.0)=X ANDOL(NF,1)=Y THENOB\$=OB\$+"-"+OD\$(NF):NEXTNF ELSENEXTNF:IFOB \$=""THENOB\$=" NOTHING SPECIAL"

17Ø CLS:P\$="YOU ARE "+L\$:GOSUB5Ø

18Ø P\$="I SEE"+OB\$:GOSUB5ØØ

19Ø PRINT"POSSIBLE DIRECTIONS

191 IFMID\$ (D\$, 1, 1) = "N"THENPRINT" NORTH ";

192 IFMID\$ (D\$, 2, 1) = "S"THENPRINT" SOUTH ":

193 IFMID\$(D\$,3,1)="E"THENPRINT" EAST ";

194 IFMID\$(D\$,4,1)="W"THENPRINT"

WEST ";

195 IFMID\$ (D\$, 5, 1) = "U"THENPRINT"

196 IFMID\$ (D\$, 6, 1) = "D"THENPRINT" DOWN ";

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December, 1902 197 PRINT"": PRINTSTRING\$ (32, "*") 200 INPUT"WHAT NOW BOSS: ";C\$ 210 IFC\$="N"THEN601ELSEIFC\$="S"T HEN6@2ELSEIFC\$="E"THEN6@3ELSEIFC \$="W"THEN6Ø4ELSEIFC\$="U"THEN6Ø5E LSEIFC\$="D"THEN6Ø6ELSEIFC\$="LOOK "THEN16@ELSEIFC\$="HELP"THEN65@EL SEIFC\$="SAVE"THEN7ØØELSEIFC\$="LO AD"THEN8ØØELSEIFLEFT\$(C\$,2)="GO" THENC\$="*GO" 211 IFLEFT\$(C\$,3)="INV"THEN611EL SEIFC\$="SCORE"THEN3600 22Ø S=Ø:SP=Ø:FORNF=1TOLEN(C\$):IF MID\$(C\$,NF,1)=" "THENS=NF:SP=SP+ 1: NEXTNF ELSENEXTNF 23Ø IFS=ØTHENPRINT" WHAT?---": GOT02ØØ 24Ø IFSP>1THENPRINT"ONLY TWO WOR DS PLEASE": GOTO200 25Ø LC\$=LEFT\$(C\$,S-1):RC\$=RIGHT\$ (C\$,LEN(C\$)-S):IFRC\$="UP"THENRC\$ ="*UP" 26Ø FC\$(Ø)="*":FORNF=1TO4Ø:IFLEF T\$(LC\$.3)=FW\$(NF)THENFC\$(Ø)=FC\$(NF): NEXTNF ELSENEXTNF 27Ø IFFC\$(Ø)="*"THENPRINT"I DON' T RECOGNIZE THE VERB": GOTO200 280 SC\$(0)="*":FORNF=1TO##:IFLEF T\$(RC\$,3)=SW\$(NF)THENSC\$(0)=SC\$(NF): NEXTNF ELSENEXTNF 300 IFSC\$(0)="*"THENP\$="I DON'T KNOW WHAT A "+RC\$+" IS": GOSUB500 : GOTO2ØØ 310 M=0:FORNF=1TOLEN(SC\$(0)):IFM ID\$(SC\$(Ø),NF,1)=FC\$(Ø)THENM=99: NEXTNF ELSENEXTNF 320 IFM=0THENP\$="I DON'T KNOW HO W TO "+LC\$+" A "+RC\$:GOSUB500:GO T02ØØ 33Ø ONASC(FC\$(Ø))-64GOSUB1ØØØ,11 00,1200,1300,1400,1500,1600,1700 , 1800, 1900, 2000, 2100, 2200, 2300, 2 400,2500,2600,2700,2800,2900,300 0,3100,3200,3300,3400,3500 34Ø IFR=1THENR=Ø:GOTO1ØØELSE2ØØ 500 IFLEN(P\$)>32THENP1\$=LEFT\$(P\$,32):P2\$=RIGHT\$(P\$,LEN(P\$)-32)EL SEIFLEN(P\$)=32THENPRINTP\$;:RETUR NELSEPRINTP\$: RETURN 510 IFLEFT\$(P2\$,1)=" "THENP2\$=RI GHT\$ (P2\$, LEN (P2\$)-1): PRINTP1\$;:P \$=P2\$:GOTO500 52Ø IFRIGHT\$(P1\$,1)=" "ANDLEN(P1 \$) =32THENPRINTP1\$; :P\$=P2\$:GOTO5Ø

ØELSEIFRIGHT\$(P1\$,1)=" "THENPRIN TP1\$:P\$=P2\$:GOTO500 53Ø P2\$=RIGHT\$(P1\$,1)+P2\$:P1\$=LE FT\$(P1\$,LEN(P1\$)-1):GOT0520 601 IFMID\$ (D\$, 1, 1) = "N"THENY=Y-1:

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GOTO1ØØELSE6Ø7 602 IFMID\$(D\$,2,1)="S"THENY=Y+1: GOTO1ØØELSE6Ø7 603 IFMID\$ (D\$, 3, 1) = "E"THENX=X+1: GOTO1ØØELSE6Ø7 604 IFMID\$(D\$.4.1)="W"THENX=X-1: GOTO1ØØELSE6Ø7 6Ø5 IFMID\$(D\$,5,1)="U"THENY=Y+/: GOTO1ØØELSE6Ø7 606 IFMID\$ (D\$, 6, 1) = "D"THENY=Y-/: GOTO100 607 PRINT"YOU CAN'T GO THAT WAY" : GOT02ØØ 610 'INVENTORY 611 IN\$(Ø)="":FORNF=1TO%%: IFIN\$(NF)<>"*"THENFORI=1TO\$\$: IFIN\$(NF) =OK\$(I)THENIN\$(Ø)=IN\$(Ø)+"-"+OD\$ (I): NEXTI: NEXTNF ELSENEXTI: NEXTN F ELSENEXTNF 612 IFIN\$(Ø)=""THENIN\$(Ø)="YOU A RE NOT CARRYING ANYTHING "ELSEIN\$ (Ø)="YOU ARE CARRYING"+IN\$(Ø) 613 P\$=IN\$(Ø):GOSUB5ØØ 614 GOT02ØØ 650 PRINT"IT IS NOT IN MY POWER TO HELP": GOTO200 700 CLS: INPUT"READY TAPE<PLAY & RECORD>ENTER"; E\$ 710 OPEN"O",-1, "GAPADFIL": PRINT# -1.X.Y.SC:FORNF=1T0%%:PRINT#-1,I N\$ (NF): NEXTNF: FORZ=1TOXX: FORW=1T DYY: PRINT#-1, MC\$(Z, W): NEXTW, Z: FO RNF=1TD\$\$:PRINT#-1.OL(NF.Ø).OL(N F, 1): NEXTNF: CLOSE: GOTO100 800 CLS: INPUT"READY TAPE<PLAY>EN TER";E\$ 810 OPEN"I",-1,"GAPADFIL":INPUT# -1, X, Y, SC: FORNF=1TO%%: INPUT#-1, I N\$ (NF): NEXTNF: FORZ=1TOXX: FORW=1T OYY: INPUT#-1, MC\$(Z, W): NEXTW, Z:FO $RNF=1TO$$:INPUT#-1,OL(NF,\emptyset),OL(N$ F, 1):NEXTNF:CLOSE:GOTO100 1000 IN\$(0)="":FORNF=1TO%%:IFIN\$ (NF)=RC\$ THENIN\$(Ø)="YOU ALREADY HAVE THE "+RC\$: NEXTNF ELSENEXTN 1001 IFIN\$(0)<>""THEN1050 1Ø1Ø FORNF=1TO%%: IFIN\$(NF)="*"TH ENIN\$ (Ø) = STR\$ (NF) : NEXTNF ELSENEX 1020 IFINs(0)=""THENINs(0)="YOU CAN'T CARRY ANY MORE": GOTO1050 1030 FORNF=1TO\$\$: IFRC\$=OK\$(NF)AN DOL(NF,Ø)=X ANDOL(NF,1)=Y THENIN \$(VAL(IN\$(Ø)))=OK\$(NF):OL(NF,Ø)= -1:OL(NF,1)=-1:IN\$(Ø)="":NEXTNF ELSENEXTNF 1040 IFIN\$ (0) = ""THENR=1ELSEIN\$ (0)="I DON'T SEE A "+RC\$ 1050 PRINTINS(0): RETURN

1100 IN\$ (0) = "": FORNF=1TO%%: IFIN\$ (NF)=RC\$ THENIN\$(Ø)="*": IN\$(NF)= "*":FORCK=1TO\$\$:IFOK\$(CK)=RC\$ TH ENOL(CK,Ø)=X:OL(CK,1)=Y:NEXTCK E LSENEXTCK: NEXTNF ELSENEXTNF 1110 IFIN\$(0)=""THENPRINT"YOU AR E NOT CARRING THAT": RETURNELSER= 1: RETURN 1200 GOTO3700: LOOK EXAMINE 1300 PRINT"USE N S E W U D FOR D IRECTIONS": RETURN 1400 GOTO3700: 'OPEN 1500 GOTO3700: 'CLOSE 1600 GOTO3700: 'HIT ATTACK KILL 1700 GOTO3700: LOCK 1800 GOTO3700: 'UNLOCK 1900 GOTO3700: MOVE LIFT TILT TW IST PUSH PULL SHOVE 2000 GOTO3700: 'CLIMB 2100 GOT03700: 'PLAY 2200 P\$="OK '"+RC\$+"' ---NOTHING HAPPENED": GOSUB500: RETURN: 'SAY 2300 GOT03700: 'READ 2400 GOTO3700: 'RUB 2500 GOT03700: 'TURN 2600 GOTO3700: 'TOUCH 2700 GOTO3700: ASK 2800 GOTO3700: JUMP 2900 GOTO3700: 'SWIM 3000 GOTO3700: 'KICK 3100 GOT03700: 'SMASH 3200 GOTO3700: WIPE 3300 GOTO3700: TRY USE 3400 GOT03700: 'EAT 3500 GOT03700: DRINK 3600 PRINT"YOUR PRESENT SCORE IS "; SC: GOT02ØØ 3700 PRINT"I AM NOT PROGRAMED FO R THAT": RETURN 4000 'LOOP CODES 4001 '## TOTAL SECOND WORDS 4002 '\$\$ TOTAL OBJECTS 4003 '%% OBJECTS POSSIBLE TO HOL 4004 '&& TOTAL 1ST LOCATION PHRA SES 4005 '>> TOTAL 2ND LOCATION PHRA SES 4006 '^^ TOTAL 3RD LOCATION PHRA SES 4007 '@@ TOTAL 4TH LOCATION PHRA SES 4008 'YY NUMBER OF ROWS IN MAP 4009 XX NUMBER OF COLUMNS IN MA 4010 '++ TOTAL OF &&+>>+^^+@@ 4011 '/ Y OFFSET FOR UP/DOWN 4012 'VARIABLE LIST 4013 'MC\$(XX, YY) MAP CO-ORDINATE S-HOLDS CODES FOR DIRECTION AND

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LOCATION DESCRIPTION 4014 'IN\$(%%) INVENTORY 4Ø15 'FW\$(4Ø) 1ST WORDS 4Ø16 'SW\$(##) 2ND WORDS 4017 'FC\$(40) FIRST COMMAND ON G OSUB CODE LETTER 4018 'SC\$(##) SECOND COMMAND COM PATIBILITY CODE LETTERS 4019 'OB\$ OBJECTS AT PRESENT LOC ATION 4020 'OL(\$\$,0),OL(\$\$,1) X,Y LOCA TION OF OBJECTS 4021 'OD\$(\$\$) FULL DESCRIPTION O F OBJECTS 4022 'OK\$(\$\$) OBJECT KEY WORDS 4023 'NF LOOPS 4024 'D\$ DIRECTION ALLOWED PRESE NT LOCATION 4025 'L1, L2, L3, L4 POSITION OF LO CATION PHRASE IN DATA 4026 'L' COMPLETE DESCRIPTION PR ESENT LOCATION 4027 'DUMMY'S DATA DUMP 4028 'P\$,P1\$,P2\$ PRINTING WITHOU T BREAKING WORDS 4029 'C\$ COMMAND INPUT 4030 'LC\$ 1ST COMMAND WORD 4031 'RC\$ 2ND COMMAND WORD 4032 'S POSITION OF SPACE IN C\$ 4033 'SP NUMBER OF SPACES IN C\$ 4034 'M CHECK FOR WORD MATCH 4035 'CK, I LOOPS 4036 'R SET TO 1 TO SEND PROGRAM TO LINE 100 ON RETURN FROM SUBR OUTINES 4037 'Z,W REPLACES X,Y FOR SAVE & LOAD 10000 DATA FOR LOCATION DESCRIPT ION 20000 DATA GET, A, TAK, A, DRO, B, PUT , B, LOO, C, EXA, C, RUN, D, WAL, D, *GO, D , OPE, E, CLO, F, HIT, G, ATT, G, KIL, G, L OC, H, UNL, I, MOV, J, LIF, J, TIL, J, TWI ,J,PUS,J,PUL,J,SHO,J,CLI,K,PLA,L , SAY, M, REA, N, RUB, O, TUR, P, TOU, Q, A SK,R,JUM,S,SWI,T,KIC,U,SMA,V,WIP , W, TRY, X, USE, X, EAT, Y, DRI, Z



30000 DATA FOR SECOND WORDS+COMP ATIBLE FIRST WORD CODES EG:-LAM, ABCJOQV

40000 DATA FOR DIRECTION ALLOWED AND LOCATION DESCRIPTION CODES EG: -*SE***02030809

50000 DATA FOR OBJECTS-X,Y START ING LOCATIONS-FULL DESCRIPTION-K EY WORD EG: -5,12,A SMALL GOLDEN RING,RING

60000 DATA 'MACHINE CODE TO POKE



Software Review ...

Reversi is Chip Off Popular Old Block

The computer screen, especially CoCo, with its vivid color displays is wonderfully adaptable to the board-game format. In the case at hand, an ancient Chinese board game, which in modern times has come to be known as Othello, has been updated to a digitally-stored board in an electromagnetic box and renamed Reversi. Maybe its a sign of the times, but the first I ever laid eyes on this age-old diversion it was already in its machine-language, electronic state. And I thoroughly enjoyed it.

First of all, I'm especially fond of games that keep the rules simple and place the difficulty into playing strategy. This must be a fairly universal predisposition, as evidenced by *Reversi's* trek through the ages in its pre-electronic form.

Reversi is played on a standard eight-by-eight board with 64 markers that are different colors on each side. Two players (the computer can be a player in this case) alternate play by laying a marker on an unoccupied square until all legal moves have been made. A 'legal' move is placing your marker (a blinking cursor) on an unoccupied square with at least one of your opponent's markers between your new marker and one of your existing markers. You can do this horizontally, vertically or diagonally. By entering your move (laying your marker) you capture your opponent's markers which lie on the direct line between yours; their colors reverse, and those markers now belong to you. When there are no more legal moves, the game is over, and the player with the most markers wins. Simple — and fun,

Reversi gives you a choice of colors for board, background and markers in several combinations, a choice of opponents (either CoCo or a human friend), and either joystick or keyboard control. After trying both control systems, I found that this is one of the few games I prefer to play via keyboard. Your lack of joysticks should be no drawback, here. When I mentioned choice of opponents just now, I should have counted CoCo as eight separate contenders, each one more adroit than the last, as Reversi has that many levels of difficulty to choose from.

Score is kept along the right side of the board, so you don't even have to count your markers — unless you're a very skeptical loser. I lost to my programmed opponent more often than not, and still enjoyed the game.

All in all, I would say this is a very good show from COCOPRO.

(COCOPRO, P.O.Box 37022, St. Louis, MO 63141, \$14.95 tape or disk)

-Courtney Noe



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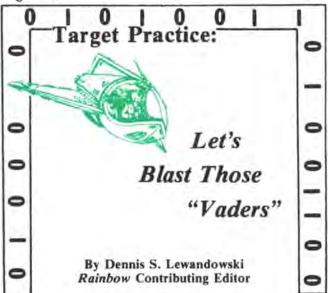
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(Mr. Lewandowski, an experienced assembly language programmer and teacher, is president of DSL Computer Products.)

Last month we made a base with the capability of shooting, but nothing to shoot at. This month we are going to give you some targets. If you typed in last month's program, or if you received Rainbow on Tape, entering the program should be no trouble, as this is a continuation of it. The added lines are all marked with asterisks. This way all you have to do is insert them, rather than retype the entire program. What? You haven't entered last month's program?! Well, what can I say? You'll just have to type it all in to catch up.

Before we look at this month's listing I have two corrections. ONE: The screen dump program in the Septmeber '82 Rainbow will not work with STANDARD Basic unless you add two lines.

LDA #\$7E JUMP OPCODE

STA \$016A POSITION FOR OPCODE

Insert these instructions between lines 4 and 5; otherwise the screen dump routine will be ignored until you get Extended Basic. Yes Virginia, some people still don't have Extended!

TWO: The JOYSTK routine only stores values between zero and 63. Rather than zero to 255, 255 is the value of the memory location if a joystick is *not* plugged in.

This month we are going to set up and use memory locations as counters. In the EQUate table we have added four new memory locations labeled COUNT, POS for position, NWPOS for new position, and HITS. Rather than use the method setting a specific value for a routine, we are going to set up counters so we may reuse routines for larger or smaller data movements. Going down the listing, the next step is to zero our new variable locations, as we do in lines 20 and 22. When should we draw our targets? Probably right after we draw the base. The next section we insert, lines 31 and 40, does just that. First, we set up the counter for the number of "vaders" we want per line. Eight "vaders" will give us half a line on the screen. Now where do they go? Let's leave some space at the top of the screen, say one line. OK. the number of targets is stored in the memory location labeled COUNT, and the position where we wish to have them drawn is stored in POS.

To display the targets we use a routine called VLOOP, for "vader" loop. Before we get too far into VLOOP, I should point out that POS, and NWPOS, are variables. In line 35 we resave the starting memory location, since we are going to modify this data while drawing the targets. Next, we load the Y register with the VADER graphic. In line 37 we do

something a little different—we branch to LOOP, the same routine we use for drawing the base. Once finished drawing the first vader, we DECrement the COUNT memory location. Now we only have seven in COUNT, which is the same as the number of vaders left to draw. Since COUNT is not equal to zero, the test in line 39 fails. We have to reload the X register with the last graphic position, since drawing the vader has modified the X register. Now, we add two by loading the B register with two, and adding B to X. This process is repreated until all eight vaders are drawn. This is known as a "down-counter." Once the value of COUNT equals zero, the test in line 39 is true, and the program branches to GETKEY, the main body of this program.

Once we get to GETKEY, we find this too has been changed. Instead of finding the usual waiting for a keypress, we find an INCrement of COUNT. The next line, 68, says BEQ MOVE. Time out for a moment. If we Brance (if equal) we're looking for a zero. And if we increment, we're adding one each time through the loop, so how do we get to zero? Once the number of increments reaches 255, what comes next? Remember this is an eight bit counter, after 255 comes zero. The test in line 68 is true, and we branch to MOVE. After all, what's the fun in shooting stationary targets.

At MOVE, line 114, we find a need for the starting position of the line of vaders. There are eight vaders, each one-memory-byte wide, and three bytes in height. Three rows of data equal 96 bytes, or \$60 hex. This is the value we set our next down-counter to. Going through a series of loades and stores, we shift the data one byte. During this loop you may notice we decrement the count twice, yet only perform one test for zero. Since \$60 is an even number, we can get away with skipping the odd number counts. Once the data, vaders in this case, are moved, we have to clean up the graphic data in the start position. To do this, we load the A register with a zero, and store it in the starting byte. Instead of loading X with the start location, and incrementing it with the familiar "X+" instruction, we turn POS into a counter. Incrementing POS+1, we are actually adding one to the LSB (Least Significant Byte) of the data the X register will use the next time this routine is called.

Well, that's it for this month. I would like to take this opportunity to wish you all a Merry Christmas, and a Happy, Healthy New Year.

The listing:

9991	9699			NAM	SPACE	
6992	9699		HYRES	EQU	\$E##	
9993	9699		VAR	EQU	\$300	
9994	0500		NEWPL	EQU	\$302	
0005	9699		COUNT	EQU	\$384	**********
8886	9699		PDS	EQU	\$386	**********
9997	8688		NWPDS	EQU	\$368	*********
9998	9699		HITS	EQU	\$38A	**********
0009	9699		SHOT	EQU	\$BØ	
9919	9699			ORG	\$1A00	
9911	1A99	8600	START	LDA	#\$CØ	MEDIUM GRAFICS
0012	1A82	B7FF22		STA	\$FF22	SET CONTROL
0013	1A#5	B7FFC7		STA	\$FFC7	MOVE SCREEN UP
9914	1A08	B7FFC9		STA	\$FFC9	INTO HIGH MEM
9915	1AØB	B7FFCB		STA	\$FFCB	FOR DISK USERS
0016	IABE	B7FFC5		STA	\$FFC5	SET VDG
0017	1A11	000000	SCREN	LDD	#0	PUT Ø IN D
9918	1A14	B79399		STA	VAR	PUT Ø IN VAR
0019	1A17	FDØ3Ø6		STD	POS	ZERO IT******
9929	IAIA	FD0308		STD	NWPOS	ZERD IT*****
9921	1AID	FDØ3ØA		STD	HITS	ZERO HITS****



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	1A20 8E8E88		LDX #HYRES	PUT START IN X	0082 1AB1 108E1A7A		LDY #CLNUP	BLANK GRAPHIC
		PCLS	STD ,X++	DOUBLE TIME	9983 1AB5 8DA9		BSR DRBS	ERASE OLD POS'IN
9924	1A25 8C1A00		CMPX #\$1AØØ	END OF SCRN	0084 1AB7 7C0303		INC NEWPL+1	ONE PLACE
0025	1A28 26F9		BNE PCLS	CLEAR THAT SCRN	9985 1ABA BE0302		LDX NEWPL	GET POSITION
9926	1A2A 8E19AE		LDX #\$19AE	START POS'IN	0086 1ABD 108E1A72		LDY #BASE	GET GRAPHIC
9927	1A2D BFØ3Ø2		STX NEWPL	SAVE LOCATION	ØØ87 1AC1 8D94		BSR DRBS	DISPLAY IT
9928	1A30 108E1A72		LDY #BASE	GET BASE GRAFIC	0088 1AC3 20C6		BRA GETKEY	DONE
0029	1A34 BD21		BSR DRBS	DRAW BASE	0089 1AC5 BE0302	MOVLF	LDX NEWPL	GET CURRENT LOC
0030	1A36 8608		LDA #8	# OF VADERS****	0090 1AC8 8C19A1		CMPX #\$19A1	LF LINIT
0031	1A38 B7Ø3Ø4		STA COUNT	SET # ******	9091 1ACB 27BE		BED GETKEY	TOO FAR
0032	1A3B 8EØE2Ø		LDX #\$BE28	VADR START**	9992 1ACD 198E1A7A		LDY #CLNUP	BLANK BASE
			STX POS	SAVE POS******	0093 1AD1 8D84		BSR DRBS	ERASE
0034	1A41 BFØ3Ø8	VLOOP	STX NWPOS	SAVE HERE TO*	0094 1AD3 7A0303		DEC NEWPL+1	ONE SPACE
	1A44 108E1A82		LDY #VADER	GET GRAPHIC*	0095 1AD6 BE0302		LDX NEWPL	GET LOCATION
	1A48 8D1Ø		BSR LDOP	DISPLAY IT***	0096 1AD9 108E1A72		LDY #BASE	GET GRAPHIC
			DEC COUNT	8 YET?******	9097 1ADD BD1A57		JSR DRBS	DISPLAY******
9938	1A4A 7AØ3Ø4 1A4D 273C		BEQ GETKEY	OK DONE****	0098 1AE0 20A9		BRA GETKEY	DONE
	1A4F BEØ3Ø8		LDX NWPDS	GET POS*****	0099 1AE2 FC0302	FIRE	LDD NEWPL	GET BASE LOC
	1A52 C6#2		LDB #2	NEXT POSITION***	0100 1AE5 830020	LOOP1		NEXT LINE UP
	1A54 3A		ABX	CONTRACT THE RESERVED TO SERVED STATES	0101 1AE8 10830E00		CMPD #\$0E00	
	1A55 20EA		BRA VLOOP	TILL DONE****	Ø1Ø2 1AEC 259D		BLO GETKEY	TOP OF SCREEN
		none	LDX NEWPL					BACK TO MAIN
	1A57 BEØ3Ø2	LOOP		GET BASE POS'IN	0103 1AEE 1F01		TFR D, X	
	1A5A A6AØ		LDA ,Y+	PUT GRAFIC IN A	0104 1AF0 E684 0105 1AF2 2E34		LDB ,X	HIT?********
0040	1A5C 8100		CMPA ##	CLS GRAPHIC	9193 1AFZ ZES4		BGT HIT	IF DO 17******
0040	1A5E 27Ø8		BEQ OK	LET IT PASS	0106 1AF4 8680		LDA #\$8Ø	SHOT GRAPHIC
994/	1A69 B191		CMPA #1	ARE WE DONE	Ø107 1AF6 A784		STA ,X	And the contract of the contra
0048	1A62 27Ø8		BEQ DONE		Ø1Ø8 1AF8 4A	LOOP2	DECA	SMALL WAIT
9949	1864 8120		CMPA #\$20	IS IT OFFSET	\$189 1AF9 26FD		BNE LOOP2	SO WE CAN SEE
0050	1A66 2505		BLO OFFSET	THEN DOIT	Ø11Ø 1AFB A784		STA , X	CLEAN UP SHOT
0051	1A68 A780	OK	STA , X+	IF NOT DISPLAY IT	Ø111 1AFD 1F1Ø		TFR X,D	SWITCH BACK
0052	1A6A 29EE		BRA LOOP	NEXT GRAPHIC	Ø112 1AFF 20E4		BRA LOOP1	TO THE TOP
9953	1A6C 39	DONE	RTS	RETURN	9113 1801 BE0306	MOVE	LDX POS	BET LINE ADR***
9954	1A6D 1F89	OFFSET	TFR A, B	SWITCH A WITH B	0114 1B04 8660		LDA #\$60	# OF BYTES****
	1A6F 3A		ABX	ADD B & X	Ø115 1806 B70301		STA VAR+1	SAVE # *****
	1A78 28E8		BRA LOOP	CONTINUE	0116 1B09 A680		LDA , X+	GET BYTE *****
	1A72 801E	BASE		TOP & OFFSET	Ø117 18ØB E684	AA	LDB ,X	GET NEXT BYTE***
The second second	1A74 2AAA1E	2412.5	FCB \$2A, \$AA, \$1E		Ø118 1BØD A78Ø		STA , X+	MOVE BYTE*****
	1A77 2AAAØ1		FCB \$2A, \$AA, 1	BOTTOM	Ø119 180F 7A0301		DEC VAR+1	COUNTER-1****
	1A7A ØØ1E	CI NUP	FCB Ø, \$1E	TOP	0120 1812 A684		LDA ,X	GET ANOTHER****
	1A7C 00001E	CLITO	FCB Ø, Ø, \$1E	MIDDLE	Ø121 1814 E78Ø		STB .X+	PUT IN POS'N***
	1A7F 000001		FCB 0,0,1	BOTTOM	Ø122 1816 7AØ3Ø1		DEC VAR+1	DNE DONE****
	1A82 76001E	VADER	the state of the s	TOP*****	Ø123 1B19 26FØ		BNE AA	DONE YET?*****
	1A85 55001E	THEL	FCB \$55,0,\$1E	MIDDLE***	0124 1B1B BE0306		LDX POS	GET LINE ADR***
	1A88 410001		FCB \$41,0,1	BOTTOM****	Ø125 181E 8600		LDA #Ø	BLANK GRAPHIC***
	1A8B 7CØ3Ø4	RETVEV	INC COUNT	TIMER******	0126 1B20 A784		STA , X	CLEAN START POS*
	1ABE 2771	DEINEI			0127 1B22 7C0307		INC POS+1	NEW LOCATION*
			BEQ MOVE	IS IT TIME?***	Ø128 1825 7E1A88		JMP GETKEY	SOTO MAIN***
	1A90 BDA1C1		JSR \$AICI	INKEY\$	Ø129 1828 7CØ3ØA	HIT	INC HITS	
	1A93 27F6		BEQ GETKEY		0130 1828 1F10	nr)		# OF HITS****
	1A95 8109		CMPA #9	RT ARROW?	The second of th		TFR X,D	SWITCH X&D****
	1A97 2710		BEQ MOVRT	MOVE RIGHT	0131 1B2D 830040		SUBD #\$40	POSITION****
	1A99 8108		CMPA #8	LF ARROW?	Ø132 1B3Ø 1FØ1		TFR D, X	BACK IN X*****
	1A9B 2728		BEQ MOVLF	MOVE LEFT	Ø133 1832 1Ø8E1A7A		LDY #CLNUP	GET BLANK***
	1A9D 8120		CMPA #\$20	SPACE?	Ø134 1836 BD1A5A		JSR LOOP	ERASE VADER***
	1A9F 2741		BEQ FIRE	SHOOT SHOT	0135 1B39 B6030A		LDA HITS	GET NUMBER***
	1AA1 8158		CMPA ##58	Χ?	Ø136 1B3C 81Ø8		CMPA #8	ALL GONE?*****
	1AA3 1027009E			EXIT ******	Ø137 183E 1Ø27FEBE		LBEQ START	GO AGAIN***
	1AA7 20E2		BRA GETKEY	NONE OF ABOVE	Ø138 1842 7E1A8B	3474	JMP BETKEY	GOTO MAIN***
9979	1AA9 BEØ3Ø2	MOVRT	LDX NEWPL	GET CURRENT LOC	Ø139 1B45 ØA71	BACK	DEC \$71	-1 RESTART VECTOR
	A CONTRACTOR OF THE PARTY OF TH							
0080	1AAC BC19BF 1AAF 27DA		CMPX #\$19BF BEQ GETKEY	RT LIMIT	0140 1847 7EA027 0141 184A		JMP \$A027 END START	BACK TO BASIC



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Utilities ...

Three Disk Utilities Give You Filing Help

By Paul Selig, Jr.

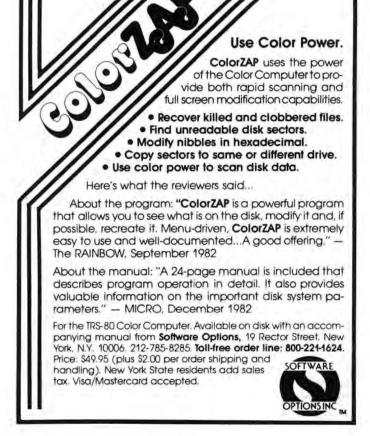
If you have ever had a program generate a disk file, you will probably want to look at that file without loading in the main program. This collection of disk utilities will allow you to do just that. It is also handy for handling any file that is in ASCII format on disk. The only requirement is that you must have a sequential file to work with. However, most files generated by your system will be sequential, and these programs will work.

The first program is called FLSRCH, and is the most useful. This program will take the file of your choice and search through it to find the occurance of the word or phrase you specified. It will find every occurance of this word or phrase, and will not stop searching until it reaches the end of the file, or you press the "up-arrow" key. If you have to search for a lower case phrase, do a "shift 0" before running the program. If you have run the program and want to know what files are on the disk before you type it in, just press "enter" at the filename prompt.

The second listing is of a program called FLPRINT. This program will allow you to print out any sequential file on disk to the screen or printer. If you choose the screen, type a high number for the delay between strings. This will allow you to easily read the file. If you are printing the file on a

printer, use a delay of "1."

The third listing is of a program called FLCONVRT. This file manipulation program is the most complicated, and also one of the most useful (when it is needed in such a situation). To use this program, take a program that you have on disk



that is in upper/lower case (such as a file by a word processor). Use this file as your input file. Use any other name for the output file. The program will start to convert the upper/lower case file to all upper case. This conversion will take time, and the program is slow, but it does do the job. The program will read in the input file, convert it, and write out the output file. Now you can kill the input file, and rename the output file. I use this program to take data from a Honeywell system, which outputs in lower case, and convert it to upper case so I can read it on my screen (I don't have a printer yet; if you do, this program is not much use to

I hope you use and enjoy these programs, and if you have any questions, contact me on Compuserve at 70065, 734, or at my address: Paul Selig, Jr., 20734 Stanford Avenue,

Fairview Park, OH 44126.

Listing 1:

1Ø GOTO23Ø

2Ø CLEAR18ØØ: X=Ø

3Ø REMARKABLE PROGRAM BY PAUL SE LIG, JR.

4Ø REM ALL RIGHTS RESERVED

5Ø REM

60 REM

7Ø CLS:PRINTSTRING\$(32,255);:PRI NTCHR\$(255); "DISK TEXT FILE SEAR

CH UTILITY "; CHR\$ (255);

8Ø PRINTSTRING\$ (32,255)

90 LINEINPUT"FILENAME TO SEARCH (NAME/EXT): "IF\$

100 IF F\$=""THEN DIR:FORX=1T0300 Ø: NEXTX: GOTO7Ø

110 CLS:PRINT"INSERT DISK IN DRI VE 'Ø' AND PRESS <ENTER>.":LI NEINPUTZ\$

120 CLS:LINEINPUT"WORD OR PHRASE

TO BE SEARCHED FOR: " ; PH\$ 130 PRINT"PRESS '^' TO STOP":FOR

X=1T01ØØØ: NEXTX

14Ø OPEN"I",1,F\$

15Ø IF EOF(1)=-1 THEN 22Ø

16Ø IFINKEY\$="^"THENGOTO22Ø

170 LINEINPUT #1,A\$:PRINTA\$

18Ø C=INSTR(1,A\$,PH\$)

19Ø IF C=Ø THEN GOTO15Ø

200 SOUND10, 10: PRINTSTRING\$ (32, 1

28):PRINTA\$:PRINT:PRINTSTRING\$(3 2,128)

21Ø LINEINPUT"<ENTER> TO CONTINU E. "; Z\$: GOTO15Ø

220 CLOSE #1:LINEINPUT"END OF FI LE: PRESS (ENTER) TO CONTINUE:

"; Z\$: CLS: RUN

230 PCLEAR1: GOTO20

Listing 2:

1Ø GOTO18Ø

20 CLEAR1800:CLS:PRINTSTRING\$(32

3Ø PRINTCHR\$(159);" DISK TEXT FI

LE PRINT UTILITY "; CHR\$(159); 4Ø PRINTSTRING\$(32,159):PRINT:LI

NEINPUT"ENTER FILENAME (NAME/EXT

): ";F\$

5Ø IF F\$=""THEN DIR:RUN

60 CLS:LINEINPUT"PUT DISK IN DRI

VE 'Ø', AND PRESSENTER TO CONTIN UE."; Z\$

70 CLS:LINEINPUT"SPEED (1=FAST - 500=SLOW): ";S\$:S=VAL(S\$)

80 CLS:LINEINPUT"OUTPUT TO A PRI NTER (Y/N)?";PN\$:IFLEFT\$(PN\$,1)=

"Y"THEN PR=1

9Ø REM

100 CLS: OPEN" I". 1.F\$

110 IF EOF(1)=-1THEN170

120 LINEINPUT #1,L\$:PRINTL\$

130 IF PR=1 THEN PRINT #-2,L\$

14Ø FORX=1 TO S:NEXTX

150 IF INKEY\$="^"THEN GOTO 170

16Ø GOT011Ø

17Ø CLOSE #1:PRINTCHR\$(255)"DONE

"CHR\$(255):LINEINPUT"PRESS ENTER

TO CONTINUE."; A\$: RUN

18Ø PCLEAR1:60T02Ø

Listing 3

RAINBOW

1Ø CLS:CLEAR18ØØØ

20 PRINTSTRING\$ (32, 207); :PRINTCH

R\$(207); " DISK TEXT CONVERSION:

L TO U "; CHR\$ (207); :PRINTSTRING\$ (32,207)

3Ø LINEINPUT"FILENAME (NAME/EXT)
: ":F\$

40 CLS:PRINT"INSERT DISK IN DRIV E '0' AND PRESS THE <ENTER> K EY.":LINEINPUT Z\$:CLS

50 LINEINPUT"OUTPUT FILENAME (NA ME/EXT): ": OF\$: CLS

60 PRINT"CONVERTING FILE...PLEA

SE WAIT!"

7Ø OPEN"I",1,F\$

8Ø OPEN"0", 2, OF\$

90 IF EOF(1)=-1THEN170

100 LINEINPUT #1,L\$

11Ø FORX=1TOLEN(L\$)

120 Z\$=MID\$(L\$, X, 1)

13Ø IF Z\$=""THEN 15Ø

140 L=ASC(Z\$): IF L>=97 AND L<=12

2 THEN L=L-32: Z\$=CHR\$(L)

15Ø Q\$=Q\$+Z\$:NEXTX

160 WRITE #2,Q\$:PRINTQ\$:Q\$="":GO T090

170 CLOSE #2:CLOSE #1:PRINTCHR\$(

255); "DONE"; CHR\$ (255) 175 SOUND100, 10

18Ø LINEINPUT"PRESS (ENTER)...."

; Z\$: RUN



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Software Review ...

Among the Game Crop, This One's A Natural

A bit of background is in order. As much as I love my native Kentucky, the mass morality here can be stifling. For instance, not so many years ago a certain high-placed official in the state's fish and wildlife department decreed that, henceforth, the spelling of a popular game fish would be "croppie," not "crappie," as it's spelled in the rest of the free world. Furthermore, officialdom—and presumably all the rest of us in turn—would pronounce it "crop-e," never again "krap-e" The reason for all of this, of course, is that the new version "sounds nicer."

As one might expect, a few rebels wondered aloud if that meant that small groups of sidewalk sportsmen should now be known as "cropshooters," and would rolling "snake eyes" or "boxcars" herinafter constitute "cropping out?" Playing a bit of "crops:" sounds rather British don't you think?

To carry this whole thing one step further, "proper" people in the small town of my childhood years referred to crapshooters as "dice players," and it wasn't unheard of to run such degenerates out of town. Thus, it would have been inconceivable then to think that, three decades later, I would be "shooting" Craps in my living room, pitted against, on the one hand, some video personality named Fred, and on the other, my mother. Mom, we've come a long way, baby.

Still quite conservative, my mother did consent to try Craps recently, but thought I was quite a scamp for betting a million dollars on one roll of the dice, even though she well knew I had no intention, or chance, of either paying off or collecting. So, she would cover maybe \$10, and Fred would

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go maybe \$300,000.

In case you haven't caught on, "Fred" is part of the Craps program. He's there in case you want to play Craps and nobody else is around. You can always play with Fred, who makes his own bets and, unlike Mom, will hang right in there with any high rollers. Fred not only knows how to bet, he also knows when to bet, too. So, don't try to take old Fred to the cleaners; unless you don't mind being the "cleanee."

Though Fred was intended as a competitor for loners, quite by accident, I discovered that Fred can also join in even when others are playing—if you give him an occasional

prompt to bet when he doesn't have the dice.

All in all, Craps is a cute little game. And, while there are some crap games you can program just by reading the Basic manuals that come with your computer, this video game, by Dan Drouillard, has some refinements that make it more fun. Craps has its own croupier standing at the end of the table; that gives a lot more class than huddling in an alleyway. Also, the dice roll down the table and you see them displayed on the screen, so you can count the dots yourself. While there's no provision for side betting, the program does keep track of who owes whom what and prompts the losers with reminders like "Fred You're Ahead" and "Pay Up Folks!!"

Personally, I'd like to see a bit more craps lingo incorporated into the game. You know, "eighter from Decatur," "little Joe from Kokomo," and all that. A slap on the wrist to Dan for never using a comma or an apostrophe, too. I had to go deadpan every time "Mom Your Behind" popped on the screen. More importantly, though, Craps does "wear well," which is to say it is very straightforward and has no little quirks that become tiresome on repetition, or hold up the game unnecessarily. After all, when "Your Behind" is on the screen, you're itching to "roll 'em bones," and not about to "crop out."

(Great X-P-T, P.O. Box 9212, Livonia, MI 48150. \$14.95.)

- Jim Reed

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UNIDATFL REVISITED: Variations on Mir's Theme

32K ECB

by A. Arnold Weiss

I think that I should state that none of the following would have been possible if I had not tried Jorge Mir's "UNIDATFL" program that was published on pages 57 through 62, inclusive, of the June, 1982, issue (Vol. I No. 12) of this magazine. It is the absolute keystone of the system of programs discussed in this article. I hope that Mr. Mir will approve of the slight modifications I've made to his fine program. Although I am including a listing (LISTING 1) of the revised version of the program, I suggest that all of you who have not tried the original program get out your copies of Vol. 1 No. 12 and enter it into their computers. There is one typographical error in the original listing-LINE 1100 the "!" should read "KILL." Also, I couldn't find out how to use the calendar in LINES 1680 to 1750, inclusive, so I've deleted these lines from the revised program. For those of you who have already entered the program, LISTING #5 contains just the deletions and additions to the program.

The original program is usuable on both tape and disk systems. My revisions are usable on disk systems only. I hope that those of you who do not yet have a disk will read this anyway as I believe it will be instructive. For the cassette system user I will now explain why you can't use my revisions. You have only one buffer (#-I) available to you, and can either read from a tape or write to a tape. With a disk system you can open as many as fifteen buffers at any one time, thus sending information from the disk to RAM and back to disk in a number of combinations.

I hope that this article will serve two purposes. The first—I want to try to help my fellow beginners by explaining, in detail, how I went about designing this set of programs. The second—I hope that those of you who are more advanced will find these programs as useful as I have. Along with my word processor I consider this program to be the most useful in my library.

Now for a bit of background. Until I purchased my 80C, October of 1981, I had no experience with computers. Prior to buying the computer I bought a copy of "Getting Started With Color Basic," and then a copy of "Going Ahead With Extended Color Basic." I wanted to get a "feel" of the logic involved and see if it suited me. I ordered a computer with 32K RAM, but it was not available at that time, so I got one with 16K. I started working with the manuals, and began looking for all the magazines that had any useful information. I'm very happy that I finally discovered the Rainbow. One of the main reasons I wanted a computer was to catalog and inventory a stamp collection. I examined the Radio Shack Color Computer File ROM Pack and found it wouldn't do what I wanted. A major fault of this ROM Pack is that it will accept only upper case lettering, and most stamp catalog numbering systems use both upper and lower case letters. Also I knew that I couldn't do much until I got a disk. Two months ago I upgraded my system to 32K, and a month ago I got the disk. As soon as I got the disk I entered the "UNIDATFL" program.

I get very annoyed with much of the technical writing I read as many authors forget to define their terms. They seem to forget that there are beginners out there who want to learn. I'm forever reading "attach the whatchamacallit to the dohickey." Not knowing what either a "whatchamacallit" or a "dohickey" is, I get thoroughly lost and confused. To avoid this in this article I will now supply a few definitions I will use in discussing the files created by "UNIDATFL." File: a collection of related records, such as an address book. Record: an individual listing in a file, such as one name,

address, telephone number, and any other related data. Item: a section of a record, such as the telephone number.

I thought that starting out cataloging a stamp collection would be too ambitious, so I decided to put my address book on file using "UNIDATFL." Along with the usual listings, name, address and telephone number, I decided to include the names of all the children living at home, along with birthdays and anniversaries. See EXAMPLE A. I did this to

Example A

Bloom, Bryan & Phillipa Danielle, Adam & Ericka 7 Sandhill Crescent, Alwoodley, Leeds LS17 8DY, West Yorks, England Tel. 011-44532-689265 Birth, Bryan 9/28/46 Pippa 5/21/48 Danielle 1/7/71 Adam 1/23/73 Ericka 9/10/75 Anniv, 7/2/69

Rosenfeld, Leonard & Sallie Jane Gregg, Kenney & Karen 1030 Kipling Rd. Rudal, Pa. 19046 885-3057 Birth Len 6/28 Sallie 8/9/38 Gregg 1/7/67 Kenny 1/5/70 Karen 4/7/74

work out any bugs. I began by typing in all the last names starting with "A." Then, I returned to the menu and used the "sort" function to get all of the A's in alphabetic order. I then went back to the menu and used the "add" function and typed in all the B's. Then back to the sort, etc. This worked out quite well until I got to the letter "L." The list was getting so long that the "sort" function was taking about an hour to work.

The obvious solution was to make a file of all the last names starting with "A", sort it and save it to disk, then go back and make a file out of the "B's," sort it save it to disk, etc. Then, go back to "UNIDATFL" and reassemble the separate files into a file called "ADDRESS." I had already typed in all of the names up to and including "L," and I didn't want to retype them, so I wrote a program (GET1) to disassemble the existing "ADDRESS" file. See LISTING 2.

Listing 2

10 CLEAR10000
20 OPEN"I", #1, "ADDRESS/DAT"
30 OPEN"O", #2, "*/DAT"
40 IF EOF(1) = -1 THEN 90
50 INPUT#1, A\$
60 IF LEFT\$(A\$,1) = "*" THEN WRITE
#2, A\$ ELSE 80
70 PRINT A\$
80 GOTO 40
90 CLOSE#2
100 CLOSE #1
110 END

I tried this program and nothing happened. I finally figured out that the first letter on the last name was not in Position LEFT\$, I. As it wasn't there, I didn't know where it was. Here is where I had a bit of luck. I also subscribe to

- COMPUTER SHACK -

This was a big month for us and the Color Computer. We received over 30 programs to test and out of this 30 we decided to add 7 exciting new programs to our line of quality software. Some of the rejected programs were fairly good. But we liked a different version better. A good example is Galac attack, a good game, but we all liked Astro Blast better. Every one of the games in this ad has been tested by the Computer Shack Crew and all are rated very, very good. In 80 Micro, we publish a top ten list of what we think are the best games for the TRS-80. We would like to do the same thing for the color computer. But we need help. Please send us a list of your favorite COCO games.

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"Chromasette," and the June, 1982, issue contains a program called "DISKEDIT." This program allows you to examine a disk, track by track, sector by sector. I loaded the disk with the "ADDRESS" file on it, and started to examine it until I found the file. Here was the answer: every time you hit the "ENTER" key, the "UNIDATFL" program inserts a "]" at the beginning of the item. I then revised the "GET" program. See LISTING 2A. The asterisks in lines 30 and 60

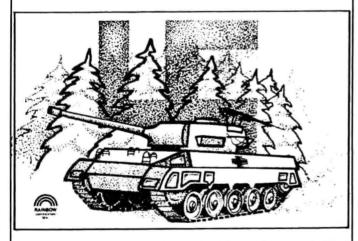
Listing 2a

10 CLEAR10000
20 OPEN"I", #1, "ADDRESS/DAT"
30 OPEN"O", #2, "*/DAT"
40 IF EOF(1) = -1 THEN 90
50 INPUT#1, A\$
60 IF LEFT\$(A\$,2) = "]*" THEN WRITE#2, A\$ ELSE 80
70 PRINT A\$
80 GOTO 40
90 CLOSE#2
100 CLOSE #1
110 END

should be replaced by one letter of the alphabet at a time. I ran the revised "GET1" program and it worked perfectly. I thought, "at last, all my troubles are over," and I can go back to "UNIDATFL" and reassemble the file.

I soon found that my optimism was ill founded. I found that if I tried to reassemble the file by adding on a file from disk to another file from a disk, I was losing part of the first file. You can add a file from disk and then add additional records from the keyboard without this problem. I didn't think that writing a program to reassemble the file would be too much of a problem. After all, if I could take a file apart I

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should be able to put it back together again. I had a bit of a head start on this as I had read an article about using multiple buffers. It warned that if you didn't close the buffers in the proper order the program would crash, and trying to list the file would produce garbage. The article suggested that you nest the opening and closing of the buffers much like a set of FOR NEXT loops—such as OPEN#1, OPEN#2, OPEN#3, CLOSE#3, CLOSE#2, CLOSE#1. I then wrote the program "PUT." See LISTING 3. I ran the program, and not only did it crash and produce

Listing 3

```
10 CLEAR 10000
2Ø FILES 3
3Ø OPEN"I",#1,"A-*/DAT"
40 OPEN"O", #2, "A-*/DAT"
5Ø IF EOF(1)=-1 THEN 1ØØ
60 INPUT#1.A$
7Ø WRITE#2.A$
8Ø PRINT A$
90 GOTO 50
100 OPEN"I",#3,"*/DAT"
110 IF EOF(3)=-1 THEN 170
12Ø INPUT#3, A$
13Ø WRITE#2,A$
14Ø PRINT A$
15Ø GOTO 11Ø
17Ø CLOSE#3
18Ø CLOSE#2
19Ø CLOSE#1
200 END
```

garbage when I tried to list it, but it started to destroy the files on the disk. I shut the system down and started to think. I remembered something I had learned long ago: when trying to solve a problem, don't get fancy, look for the simple solution. I then wrote "PUT1" and ran it. See LISTING 3A. The asterisk in LINE 30 should be a letter of the alphabet, such as "B," and the astericks in LINES 40 and

Listing 3a

```
10 CLEAR 10000
2Ø FILES 3
3Ø OPEN"I",#1,"A-*/DAT"
40 OPEN"O",#2,"A-*/DAT"
5Ø IF EOF(1)=-1 THEN 1ØØ
60 INPUT#1,A$
7Ø WRITE#2,A$
8Ø PRINT A$
9Ø GOTO 5Ø
100 OPEN"I",#3,"*/DAT"
11Ø IF EOF(3)=-1 THEN 17Ø
12Ø INPUT#3, A$
13Ø WRITE#2.A$
14Ø PRINT A$
15Ø GOTO 11Ø
17Ø CLOSE
18Ø END
```

100 should be the next letter of the alphabet. The revised program worked perfectly and I now had my "ADDRESS" file back. Now that everything was working perfectly I could go onto more ambitious projects, such as cataloging and inventorying the stamp collection.

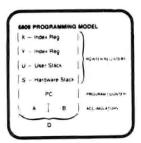
I think I should now give a bit more help to my fellow

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beginners. The "UNIDATFL" program produces an "in memory" file system. By "in memory" I mean that the file must be small enough to fit in your computer's memory. My address file is small enough, but I knew the stamp files would be too large. This started me thinking about a "sub file system," and I'll discuss that in the next paragraph. Right now, I'd like to give some hints on using the "find" function. If you look at EXAMPLE A you'll see that I've added the birthdays and anniversaries to the records. I did this as I wanted to be able to search the files for these dates. If I want to find the dates in August, and just ask for "8," I'll find every "8" in the file. If I ask for "8/" I'll find not only the month of August, but also 8th, 18th and 28th days. If I ask for "(spacebar)8/" I'll find just the month of August. I've written the proceeding to show that careful use of what you ask for can save a lot of search time.

Knowing that I would have to use multiple files to catalog the stamp collection, I added an "open new file" command to "UNIDATFL". I did this changing LINE 70 to "IF KP=0 THEN 73" and adding the following:

71 CLOSE #2

72 KP=0

73 GOSUB3500

155 IF I\$="O" OR I\$="o" THEN 3600

651 IF KP=1 THEN WRITE #2,N\$(X)

3600 KP=1: CLS: INPUT "FILE NAME": KP\$

3610 OPEN "O", #2, KP\$

3620 GOTO 100

For instance, suppose I wanted to make a separate file out of the address of just the people living in England. I could use the "find" function to search the file for "England" and get

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all the records listed on the screen, or I could print them out individually. This would give me a printed record, but I wouldn't have a file on it on disk, so I created the "O" function

The "O" command allows me to make a "sub file" out of the original file. To use this command use the following procedure: type in "f" to start the find function and type in what you want the computer to search for. If the search finds an entry in the file, type "s" to end the search, and go back to the main menu. Type "o" and answer the "?" with the new file name, and then type "f" to go back to the search, and ask for the same word as you did before. When an entry is found, press the spacebar, to get to the next entry in the file, until you reach the end of the original file, then press "S" to go back to the master menu. The computer will record each found record in the new file and close the buffer at the end of the original file. Of course, you can combine the sub files and make sub files from them ad infinitum.

Just to make certain I hadn't put another unexpected trap in the program, I tried the revised program to make a file called "ENGLAND." To see if all went well, I wrote the following program and put the "ADDRESS" and "ENGLAND" files through it.

10 CLEAR18000

20 INPUT "FILE NAME": KPS

30, OPEN "O", #1, KP\$+ "/DAT" 40 IF EOF (1) THEN 80

50 LINEINPUT#1. A\$

60 PRINTAS: PRINT: FORX=1T0460:NEXTX

70 GOTO40

80 CLOSE#1

90 END

Oops!! Another goof. The "]" didn't appear before each item in the "ENGLAND" file. Back to the drawing board. I found that lines 1050-1120 of the original program added the "]". As "N" was used as a variable in the original program, I felt that it would be better to use another variable and changed lines 72 to 'KP=0:N1=0' and 651 to 'IF KP=1 THEN 6000' and added the following.

6000 N1=N1+1

6010 Y=INSTR(N\$(X),CHR\$(13)): IF Y=0THEN6030

6020 MID\$(N\$(X),Y,1)="]"

6021 GOTO 6010

6030 WRITE#2,N\$(X): GOTO560

This not only puts the "]" at the front of each item, but it also writes all of the records with the selected word automatically, and runs very fast.

The program "PRINTI," LISTING 4, is a program I

Listing 4

10 CLEAR10000

11 CLS:PRINT:INPUT"FILE NAME":K\$

12 CLS:PRINT:INPUT" DO YOU WANT THIS TO GO TO THE PRINTER (Y

OR N) "; L\$

13 IF L\$="Y" THEN 20

14 IF L\$<>"N" THEN SOUND 200,5:P RINT"INVALID ANSWER":FORX=1T023Ø

:NEXT:GOTO 12

20 OPEN"I",#1,"ADDRESS/DAT"

3Ø IF EOF(1)=-1 THEN 8Ø

40 INPUT#1,A\$

41 F\$="]"

42 G=INSTR(2,A\$,F\$)

43 PRINT G

5Ø PRINT MID\$(A\$,2,G-1)+" - ";

51 IF Ls="Y" THEN PRINT#-2, MIDs (

A\$,2,G-1)+" - ": 60 FOR X=1T0920: NEXT 7Ø GOTO 3Ø 8Ø CLOSE#1 81 IF Ls="Y" THEN PRINT#-2, CHR\$(13) 9Ø END

wrote for my own use. As I stated earlier, I want to use this program to catalog a stamp collection. I have devised a system of thirty three character codes to describe all the characteristics of a stamp. With this system of programs, I can search my files for all the stamps that have any one of these characteristics, such as "coils," and open a sub file, combine all the sub files, and then print out the resulting file. By placing the catalog number at the start of each record, and then hitting the "ENTER" key, I can use this program to search my "COIL" sub file, and print out just the catalog numbers in numerical order.

There is now only one small problem: what to do if the file becomes too large to fit in RAM? The answer: split it. Use the "GET1" program and replace the "equals" sign in LINE 60 with "less than or equal to" marks. Then rerun the program and replace the "less than or equal to" with a "greater than". Also, remember to give two different names to the two new files. This will split the file.

The only fault left in the program is the slow sort routine. As mentioned in the September, 1982, issue (Vol. II No. 3) of the Rainbow, the July, 1982, issue (Vol. 4 Issue 6) of Radio Shack's TRS-80 Microcomputer News had a great assembly

language "string sort" program in it. As was detailed in the Rainbow, the program had a lot of typos. The corrections for 16K were listed in the Rainbow article. I also struggled with the program and figured out the corrections, and then went a bit farther and corrected it to work in 32K. I then used this program to replace the "sort" section of the "R Multiple-Disk Index" Program in the July, 1982 (Vol II No. 1), issue of the Rainbow. It works so well that I eliminated the sort feature from "UNIDATFL" by deleting lines 140 and 5030, and adding line 5035, and writing LISTING 5 to sort the files created by "UNIDATFL."

Listing 5

110 CLEAR18000, &H7EFF 12Ø A=Ø:N=Ø:I=Ø:J=Ø 13Ø DATA 19Ø,127,254,52,16,238,2 28, 174, 94, 48, 31, 79, 52, 18, 166, 196 , 39, 42, 166, 196, 230, 69, 160, 69, 36, 2,230,196,52,1,174,66,16,174,71 14Ø DATA 1Ø9,69,38,4,5Ø,97,32,41 ,166,128,160,160,39,4,50,97,32,5 ,90,38,243,53,1,35,24,174,66,16, 174, 71, 175, 71, 16, 175, 66, 166 15Ø DATA 196,23Ø,69,231,196,167, 69, 234, 69, 234, 228, 231, 228, 51, 69, 174, 97, 48, 31, 175, 97, 38, 176, 166, 2 28,50,99,38,161,50,98,57 155 B=Ø 16Ø FOR I=&H7FØØ TO &H7F66

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MATH DRILL is a program designed to help children to practice addition, subtraction, multiplication, and division skills on the COLOR COMPUTER. It has several features that make its use particularly attractive.

• Up to 6 students may use the program at the same time.

Answers for addition, subtraction and multiplication are entered from right to left, just as they are written on paper.

Commas may be included in the answers

Partial products for the multiplication problems may be computed on the screen.

Division answers that have a remainder are entered as a whole number followed by the letter "R" and the remainder.
There are ten, user modifiable, skill levels.
A "SMILEY FACE" is used for motivation and reward. Its size increases relative to the skill level.
Skill levels sufematically adjust to the student's ability.

Skill levels automatically adjust to the student's ability

· A timer measures the time used to answer each problem and the total time used for a series of problems.

After a problem has been answered incorrectly the correct answer appears under (above in division) the incorrect answer.

WORD DRILL is designed to give a multiple choice vocabulary quiz. Words and definitions are entered into the program from the keyboard or from a tape file. The computer displays a randomly chosen definition and eight word choices. The student must enter his response before a built in timer reaches zero.

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ESTIMATE is a program designed to help children to practice estimating the answers to addition, subtraction, multiplication and division problems on the COLOR COMPUTER. It has many features that make its use particularly attractive:

Up to 5 students may use the program at the same time.
 There are 5, user modifiable, skill levels.

•The acceptable percent error may be changed as a student's skill improves.

·A timer measures the number of seconds used to answer each problem and the total time used for a series of problems ·If a problem has been answered incorrectly, the student is told the

percent error and asked to try again.

olf a problem is answered incorrectly a second time, the student is told the correct answer and the range of acceptable answers is displayed.

 A report is given at the end of each set of problems that includes the number of problems done, the number of problems answered correctly on the first try and the average percent error.

The (BREAK) key has been disabled so that a child will not in-advertently stop the program from running.
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TEACHERS' DATABASE is a program designed to allow a teacher to keep a computerized file of information about his/her students. There are many features that make this program particularly attractive.

• Information on as many as 100 students (or more) may be in the

computer at one time.

Each student may have as many as 20 (or more) individual items of data in his/her record.

. The program will run from cassette or disk.

Cassette and disk files are completely compatable

The program is menu driven.

- · Records may be easily changed, deleted, combined or
- Information about students may be numerical or text.
 Records may be quickly alphabetized.
- Records may be sorted by various criteria.
- · Records may be reordered (ranked) based on test scores or other data.
- Data displayed during a sort may be printed on a printer or saved on disk or cassette as a new file.
 A full statistical analysis of data may be done and sent to the
- printer
- Student test scores may be weighted.

32K EXT BASIC **TAPE \$39.95** DISC \$42.95





170 READ A: POKE I, A 175 B=B+A 18Ø NEXT I 19Ø IF B<>11172 THEN PRINT"INVAL ID VALUE IN DATA STATEMENTS - CH ECK!":STOP 200 DIM T\$ (500) 22Ø CLS:PRINT:INPUT"FILENAME":NM \$: XM\$=NM\$+"/DAT" 221 DEFUSRØ=&H7FØØ 230 OPEN "I", #1, XM\$ 24Ø PRINT:PRINT"READING ";NM\$ 250 X=X+1:LINEINPUT#1,T\$(X) 26Ø IF EOF(1)=-1 THEN27Ø ELSE25Ø 27Ø PRINT X;" RECORDS READ":CLOS E#1:PRINT:PRINT"SORTING" 28Ø N=VARPTR(T\$(Ø)) 290 POKE &H7FFE, INT(N/256) 300 POKE &H7FFF, N-INT(N/256) *256 33Ø TIMER=Ø 340 A=USRØ(Ø) 35Ø T1=INT(TIMER/36ØØ):T2=INT((T IMER-(T1*36ØØ))/6Ø) 360 PRINT:PRINT"SORT FINISHED "; T1; "MIN"; T2; "SECS" 365 FOR JX=1T010:SOUND200,1:NEXT JX 366 PRINT: PRINT"KILLING "; NM\$ 367 KILL XM\$ 368 PRINT:PRINT"WRITING SORTED " I NMS 37Ø OPEN "O",#1,XM\$ 38Ø FOR JK=ØTOX-1 39Ø IF T\$(JK)=""THEN 42Ø 400 PRINT#1, T\$(JK) 410 NEXT JK 42Ø CLOSE#1 44Ø END

In conclusion (Hush out there, I can hear all of you saying, "The old windbag is about to shut up!") I hope that I have made myself clear to my fellow beginners, and helped them to see if a plodder like me can work this out, they can. To those of you who are more advanced than I am, I hope you find the resulting programs useful. I don't know how many of you are interested in my system for cataloging stamps. If enough of you ask Mr. Falk for it, I'll send it on to him. To those of you who have not, as yet, added a disk to their system—save your pennies to do so. The addition of a disk will make your 80C a powerful tool. To all, "happy computing!"

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RELOCATOR makes automatic tape copies of the Color Computer cartridges. Allow changes to be made to the program such as (Print-out *Videotex, change band rate in *Scripsit, etc.) Requires either 64K mod. or 4 to 8K of cartridge memory expansion in the address range of &COOO to &DFFF (64K requires some program changes.)

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Listing 1 1 GOTO 4000 2 DATA BD, B3, ED, 1F, Ø2, 7E, 96, A7 1Ø ' **** DATAFILE **** 2Ø ' BY: JORGE MIR 3Ø ' 40 CHANGE STEP 60 ACCORDING TO RAM SPACE AVAILABLE 5Ø ' 51 FOR I=ØTO7:READE\$:NEXT:FORI=Ø TO18:READE\$ 52 E=VAL("&H"+E\$):POKEI+&HEØ2,E: NEXT 53 DATA 8E,04,00,A6,80,81,60,2D,04,80,40,A7,1F,8C,06,00,2D,F1,39 54 DEFUSRØ=&HEØ2 6Ø CLEAR 18ØØØ: D=1ØØØ: DIM N\$(D) 7Ø IF KP=Ø THEN 73 71 CLOSE#2 72 KP=Ø:N1=Ø 73 GOSUB 3500 100 CLS(0):GOSUB 5000 1Ø5 I\$=INKEY\$:IF I\$=""THEN 1Ø5 110 IF I\$="A" OR I\$="a" THEN 290 120 IF I\$="F" OR I\$="f" THEN 530 13Ø IF I\$="P" OR I\$="p" THEN 153 14Ø IF I\$="S" OR I\$="s" THEN 176 Ø 150 IF I\$="E" OR I\$="e" THEN 990 155 IF I\$="0" OR I\$="0" THEN 360 16Ø SOUND 100,2:GOTO 105 29Ø GOSUB3ØØØ: X=Ø 31Ø IF TY=1 OR TY=-1 THEN 86Ø 32Ø CLS:PRINT"(TYPE '^' WHEN DON E OR TO EXIT) ": PRINT STRING\$ (32, 33Ø X=X+1:IF N\$(X)="" THEN 34Ø E LSE 33Ø 34Ø N=1 35Ø LINE INPUT I\$: IF I\$<>"^" THE N 38Ø 36Ø IF F=Ø THEN 48Ø 37Ø GOTO 7Ø 38Ø N=N+1 39Ø IF LEN(N\$(X))+LEN(I\$)=>25Ø T **HEN 410** 400 N\$(X)=N\$(X)+CHR\$(13)+I\$:GOTO 35Ø 41Ø N\$(X)=N\$(X)+"*" 42Ø IF N\$(X+1)=""THEN47Ø 43Ø Y=X 44Ø Y=Y+1:IF N\$(Y)<>""THEN44Ø 45Ø N\$(Y)=N\$(Y-1):Y=Y-1 46Ø IF Y=X THEN 47Ø ELSE 45Ø 47Ø X=X+1:N\$(X)=CHR\$(13)+I\$:GOTO 35Ø 48Ø IF N=1 THEN 7Ø 49Ø PRINT"IS ABOVE DATA CORRECT (Y/N)?":GOSUB 115Ø 500 IF I\$="Y" OR I\$="y" THEN 320 501 IF I\$="N" OR I\$="n" THEN 510 502 GOSUB 1150 51Ø GOSUB 141Ø 52Ø GOTO 58Ø 53Ø PRINT @384, "key word(s):";:X =USR(Ø) 54Ø LINEINPUT K\$ 55Ø X=Ø:SOUND2ØØ, 2:PRINT@49Ø, "se arching file";: Z=USR(Ø)

560 X=X+1: IF X=D+1 OR N\$(X)="" T

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HEN 78Ø 57Ø IF INSTR(N\$(X),K\$)=Ø THEN 56 58Ø SOUND15Ø,1:CLSØ:PRINT @48Ø," functions: a c d s p USR (Ø) 590 PRINT @0.""; 600 N=INSTR(N\$(X),"]"):IF N=0 GO TO 620 610 MID\$(N\$(X),N,1)=CHR\$(13):GOT 0 600 620 N=INSTR(N\$(X),"*"):IF N=0 TH EN 65Ø 63Ø PRINT LEFT\$ (N\$ (X), X-1) 64Ø X=X+1:GOTO 62Ø 65Ø PRINT N\$(X) 651 IF KP=1 THEN 6000 660 IF I\$="N" THEN 670 665 IF I\$<>"n" THEN 690 670 IF INKEY\$="" THEN 670 68Ø PRINT:PRINT:GOTO49Ø 69Ø GOSUB 115Ø:F=Ø 700 IF I\$="D" OR I\$="d" THEN 800 710 IF I\$="S" OR I\$="s" THEN 70 720 IF I\$="C" OR I\$="c" THEN F=1 :GOSUB 1410 730 IF I\$="P" OR I\$="p" THEN GOS UB 1190 735 IF I\$="0" OR I\$="o" THEN GOS UB 3600 740 IF I\$="?" THEN GOSUB 1290 750 IF I\$="A" THEN PRINT: GOTO 76 755 IF I\$<>"a" THEN 770 ELSE PRI NT 76Ø PRINT"SECTION TO BE ADDED: ": **GOTO 350** 770 PRINT @17, "SEARCHING FILE":G OTO 560 78Ø SOUND 200,5:CLS0:PRINT@195," <no more data on file>": Z=USR (0) 781 IF KP=Ø THEN 79Ø 782 CLDSE#2 783 KP=Ø 79Ø GOSUB 115Ø:GOTO 7Ø 800 N\$(X)="":PRINT STRING\$(32,CH R\$(128));:PRINT"ITEM DELETED FRO M FILE" 810 SOUND150, 1: PRINT" (STANDBY WH ILE FILE IS UPDATED) " 82Ø FOR XX=X TO D-1 83Ø N\$(XX)=N\$(XX+1):NEXT XX 84Ø X=X-1 85Ø GOTO 56Ø 86Ø IF TY=1 THEN GOSUB 3Ø5Ø 870 GOSUB 1170:FL\$=I\$ 88Ø N=Ø

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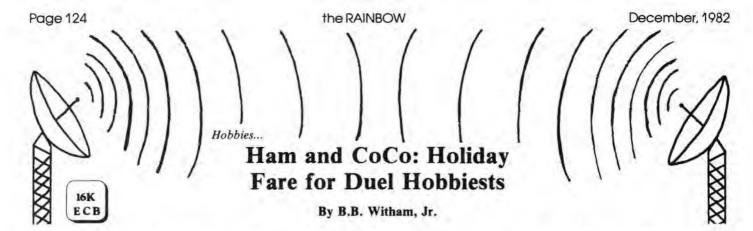
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89Ø OPEN"I", #TY, I\$ 900 N=N+1 92Ø INPUT#TY, N\$ (N) 93Ø X=INSTR(N\$(N),"]"):IF X=Ø GO TO 960 94Ø MID\$(N\$(N), X, 1)=CHR\$(13) 95Ø GOTO 93Ø 96Ø IF EOF(TY)=Ø THEN 9ØØ 97Ø CLOSE#TY 98Ø GOTO 7Ø 990 PRINT@384, "do you want to sa ve data (y/n)";:X=USR(0) 991 I\$=INKEY\$: IF I\$=""THEN 991 992 IF I\$="N" OR I\$="n" THEN CLS : END 994 IF I\$="Y" OR I\$="y" THEN PR INT @384,STRING\$(32," ");:GOTO10 10 1000 GOTO 70 1010 GOSUB3000:GOSUB 1170 1030 N=0: IF TY=1 AND FL\$=I\$ THEN CLSØ: SOUND15Ø, 1: PRINT@7*32+5, "a ld file being erased": X=USR(Ø):K ILL FL\$+"/DAT" 1035 CLS0:SOUND150,1:PRINT@7*32+ 5, "new file being created": X=USR (0) 1036 X=0 1037 X=X+1: IF N\$(X)<>""THEN1037 1040 OPEN"O", #TY, I\$ 1050 N=N+1 1060 IF N\$(N)="" THEN 1130 1070 Y=INSTR(N\$(N),CHR\$(13)):IF Y=Ø THEN 11ØØ 1080 MID\$(N\$(N),Y,1)="]" 1090 GOTO 1070 1100 IF TY<>1 THEN 1115 ELSE WRI TE #1, N\$ (N) 1110 GOTO1050 1115 PRINT#-1,N\$(N) 1120 GOTO 1050 1130 CLOSE#TY 114Ø GOTO 7Ø 115Ø I\$=INKEY\$:IF I\$="" THEN 115 116Ø I=VAL(I\$):RETURN 1170 PRINT: PRINT@448," file n ame: "; 1171 Z=USR(Ø):PRINT" 1172 PRINT @463, "";:LINE INPUT I 1175 IF I\$=""THEN7Ø 118Ø Z=USR(Ø):RETURN 1190 CLS:GOSUB 1650:IF I=1 THEN 1220 1200 PRINT@230, "PRINTER IS NOT R EADY": SOUND 100,5 1210 GOSUB 1150:GOT0580 1220 Y=INSTR(N\$(X), "*"): IF Y=0 T HEN 1260 1230 PRINT LEFT\$ (N\$ (X), Y-1):PRIN T:PRINT#-2, LEFT\$ (N\$ (X), Y-1)
1240 PRINT#-2, "":PRINT#-2, STRIN G\$(32,"*") 1250 X=X+1:GOTO 1220 1260 PRINT N\$(X):PRINT:PRINT#-2, N\$ (X) 1270 PRINT#-2, "": PRINT#-2, STRING \$(32,"*") 1280 RETURN 1290 CLS(0):PRINT" key letters:" 1300 PRINT:PRINT" a = add dat

131Ø PRINT" c = correct data" 1320 PRINT" d = delete listing 1330 PRINT" s = stop search"
1340 PRINT" p = print data"
1350 PRINT" ? = prints this li st" 1360 PRINT:PRINT " (space bar) c ontinues search" 137Ø X=X-1 1380 PRINT@480," <press any key to continue>";:Z=USR(0) 1390 IF INKEY\$="" THEN 1390 1400 RETURN 1410 PRINT: PRINT"ENTER DATA TO B E CHANGED: " 1420 LINE INPUT D1\$ 1420 LINE INPUT DIT 1430 DI=INSTR(N\$(X),D1\$) 1440 IF DI=0 THEN 1410 1450 PRINT"ENTER CORRECTED DATA: 1460 LINE INPUT D2\$ 147Ø D2=LEN(D1\$) 1480 C1\$=LEFT\$(N\$(X),D1-1) 1490 C2\$=MID\$(N\$(X),D1+D2) 1500 N\$(X)=C1\$+D2\$+C2\$ 1510 IF I\$="C" OR I\$="c" THEN X= X-1 152Ø RETURN 1530 GOSUB 1650: IF I=1 GOTO 1560 1540 PRINT@485, "PRINTER IS NOT R EADY": 1550 SOUND 150,5:FOR X=1T0500:NE XT X:GOTO7Ø 1560 PRINT@483, "PRESS 'S' TO STO P PRINTING"; 157Ø SOUND 100,5:FOR X=1 TO 500: NEXT X 1580 X=0 1590 X=X+1: IF X=D+1 GOTO 1640 1600 IF N\$(X)=""THEN 1640 1610 IF INKEYS="S" OR INKEYS="S" THEN 1640 1620 GOSUB 1190 163Ø GOTO 159Ø 164Ø GOTO 7Ø 1660 IF PEEK(65314)/2=INT(PEEK(6 5314)/2) THEN I=1 ELSE I=0 1670 RETURN 1650 REM***IS PRINTER READY? 167Ø RETURN 1800 REM****SORTING ROUTINE****
1810 FORS1=1 TO N-1 STEP2 182Ø S2=S1+1 183Ø NEXT S1 1840 53=0 185Ø S4=N 186Ø S4=INT(S4/2) 1870 IF S4=0 GOTO 2060 1880 S3=S3+1 1890 PRINT @490,"PASS #"S3; 1900 FOR S5=1 TO S4-1 191Ø S1=S5 1920 S2=S5+S4 1930 86=0 194Ø IF N\$(S1) < N\$(S2) GDTO 199Ø 1950 56=1 196Ø SS\$=N\$(S1) 197Ø N\$(S1)=N\$(S2) 198Ø N\$ (S2) = SS\$ 199Ø S1=S2 2ØØØ S2=S2+S4 2010 IF S2<N GOTO 1940 2020 IF S6=0 GOTO 2040

2030 GOTO 1910 2040 NEXT S5 2050 GOTO 1860 2050 GOTO 1860 2060 GOTO 70 2070 FOR X=1 TO 5 2080 CSAVE"DATAFILE" 2090 FOR Y=1 TO 500:NEXT Y:NEXTX 3000 PRINT @132," device to be used:"
3010 PRINT:PRINT" d - dis
k"
3020 PRINT" t - tape"
3030 IF I\$="A" OR I\$="a" OR I\$="
ADD" OR I\$="add" THEN PRINT"
k - keyboard"
3040 PRINT:PRINT@320," yo
ur choice?";:X=USR(0)
3041 I\$=INKEY\$:IF I\$=""THEN3041
3042 IF I\$="D" OR I\$="d" THEN TY
=1 ELSE IF I\$="T" OR I\$="t" THEN
TY=-1 ELSE IF I\$="K" OR I\$="k"
THEN TY=3 ELSE IF I\$=CHR\$(13) TH
EN 70 ELSE SOUND 50,2:GOTO3041 used:" EN 70 ELSE SOUND 50,2:GOT03041 3045 RETURN
3050 GOSUB3500:PRINT" these are
the files contained in the dis k at this time:":Z=USR(Ø):FOR W= 3 TO 11 3Ø6Ø DSKI\$Ø,17,W,A\$,B\$ 3Ø7Ø C\$=A\$+LEFT\$(B\$,127) 3Ø8Ø NAM\$(Ø)=LEFT\$(C\$,8) 3Ø9Ø EXT\$(Ø)=MID\$(C\$,9,3) 3100 FOR Z=1 TO 7 3110 NAM\$(Z)=MID\$(C\$,Z*32+1,8) 3120 EXT\$(Z)=MID\$(C\$,9+Z*32,3) 3130 NEXT Z 3140 FOR ZZ=0 TO 7 3150 IF EXT\$(ZZ)="DAT" AND LEFT\$ (NAM\$(ZZ)=1)<>CHR\$(0) THEN PRINT (NAM\$(ZZ),1)<>CHR\$(Ø)THEN PRINT "NAM\$(ZZ). "NAM\$(ZZ), 316Ø NEXT ZZ,W 317Ø RETURN 35ØØ SOUND15Ø,2:CLS(Ø):PRINT" universal data file" 351Ø PRINT" 3530 RETURN 3600 KP=1:CLS:INPUT"FILE NAME";K P\$ 3610 OPEN"O",#2,KP\$ 3620 GOTO 100 4000 FOR I=0T07: READ E\$: E=VAL("& H"+E\$):POKE I+&HEØ3,E:NEXT 4010 DEFUSRØ=&HEØ3:X=USRØ(&HØE18):GOTO10 5000 PRINT@134, "a - add data" 5010 PRINT@166, "f - find item"; 5020 PRINT@198, "p - print entire file"; 5030 PRINT@230,"s - sort data"; 5035 PRINT@262,"o - open new fil e"; 5040 PRINT@294, "e - exit to basic"; 5050 X=USR(0):RETURN 6000 N1=N1+1 6010 Y=INSTR(N\$(X),CHR\$(13)):IF Y=ØTHEN6Ø3Ø 6020 MID\$(N\$(X),Y,1)="]" 6021 GOTO 6010 6030 WRITE#2, N\$(X):GOTO560



Many ham radio operators seem to take to computers as a second hobby. (They seem to go together well.) Anyway, such is the plight of my wife! I have been a ham for over 25 years but got into the computer game only last year, with CoCo.

One of the first projects I undertook was to automate my logging of radio contacts. The FCC has reduced the legal requirements for logging, but I think that I, like most hams, still like to keep a rather full log for my own purposes. My first efforts were none too successful, and I must give credit to my son-in-law, R.T. Kilpatrick, of Stockbridge, GA (who also has CoCo), for his assistance and the suggestion to use line input. The program I present here is the culmination of my efforts to have a log that would incorporate the features I wanted.

First, I wanted a full feature program with add/revise/save/load/printout, etc. Also I wanted the input to be preformatted. As can be seen, this program accomplishes all of these and has a few nice features.

The present form takes about 20K and is set up for two disk drives and the line printer VII. The program can be easily modified to accommodate other peripherals.

Line 100—The DIM statement can be modified to fit memory requirements.

Lines 25, 140, 320, 570—Modify for your own callsign. Lines 810, 840, 850, 870, 910, 940, 950, and 970—Modify for single disk drive or tape.

Line 1170-Modify with your own station data.

In running the program, I usually log each day's contacts at the end of the day. On succeeding days, the create file selection is not used again. The old file is loaded and then the add selection is used to continue the file. The revise/review

selection can be used any time a file is in memory, either before saving or after loading, to review or correct. Also, the whole file does not have to be reviewed if only a single record needs to be seen or corrected.

In the printout selection, an appropriate header can be printed at the first of the log, but need not be repeated for each day.

All in all, I find this program does it all for me and I hope others will be able to use it with as much success. Questions regarding the program will be gladly answered at the address given in the header.

The listing:

10	******************
15	* STATION LOG
20	* AMATEUR RADIO STATION
25	** (YOUR CALL)
30	
35	** * * * * * * *
40	* BY: B. B. WITHAM JR. W4CNZ
45	'* 35Ø1 SEA GULL RD.
50	* VIRGINIA BEACH, VA. 23452
55	: BOND : 100 - 100 - 100 - 100 100 100 100 100 1
60	**
65	* THIS PROGRAM MAY BE USER
70	** MODIFIED. HOWEVER, THIS
75	** HEADER SHALL BE RETAINED
	** AND THE PROGRAM MAY NOT
85	** BE RESOLD.

	15 20 25 30 45 50 55 65 75 85

		IGERS GEITING	공격적 교육하다. 제 공연료 출연하
give those tired finger typingtypingtyping the one you want.	s a rest! With RAINBOW ON TAP nem! All you ever need do again is p	rom each issue of the RAINBOW? Now you E, you'll be able to spend your time toop a RAINBOW ON TAPE cassette into you	enjoying programs instead of ur recorder, CLOAD and RUN any
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A Full Ye	ar for \$60	A Month for \$6.50 (Specify Month)
Name			
Address		_ State Zip	
☐ Payment Enclosed	☐ Charge my VISA account	☐ Charge my MasterCard accoun	nt
Account #	Signature	Card Expires Interbank	·

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100 CLEAR12000:DIMDD\$(11,61):F=0 :G=450:H=482:L=136:M=137:N=0:T=1 ØØØ: V=5Ø: W=7ØØ: Y=2ØØ 110 B\$="PRESS <ENTER> TO CONTINU E":C\$="ENTRY NR:-":D\$=" '#'-RETU RNS TO MENU": GOTO140 120 A\$=INKEY\$:IFA\$="" THEN120 EL SERETURN 130 ' SET UP TITLE PAGE**** 140 CLS:SOUNDY,5:FORJ=1024 T0105 5:POKEJ,153:NEXTJ:FORJ=1504 TO15 35:POKEJ, 153:NEXTJ:FORJ=1024 TO1 504 STEP32:POKEJ,153:NEXTJ:FORJ= 1055 T01535 STEP32: POKEJ, 153: NEX TJ:PRINT@1Ø9, "W4CNZ";:PRINT@136, ">>STATION LOG<<";:PRINT@169,"--.--..";:FORTM=1TOT:NEXT 150 ' MENU*** 160 CLS: SOUNDL, 1: PRINT@42, "MAIN MENU": PRINT@134, "1) CREATE LOG F 2) LIST/REVISE ILE FILE 3) SAVE FILE 4) LOAD FILE 5) ADD TO FILE" 17Ø PRINT@294, "6) PRINT OUT

7) EXIT ROUTINE": PRINT@450, "TOTAL ENTRIES IN FILE :-"; N: PRINT@482, "LATEST DATE ON FILE: -"; DD\$ (1, X); 18Ø GOSUB12Ø 19Ø A=VAL(A\$): IFA<1 DRA>7 THENGO SUB120

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200 ON A GOTO300,500,800,900,100 0.1100.1300 300 ' CREATE LOG**** 31Ø FORX=1 TO60: IFF=1 THENX=N+1 320 CLS: PRINT@5, "STATION LOG - W 33Ø PRINT@32. "DATE: "; "----": PRINT@46, "TM: "; "----": PRINT@53, "FREQ: "; "----34Ø PRINT@64, "CALL: "; "----": PRINT@78, "NAME: "; "----" 35Ø PRINT@96, "QTH: "; "-----36Ø PRINT@128, "RST: "; "----":PR INT@138, "PWR: "; "----": PRINT@147 , "MODE: "; "----" 37Ø PRINT@16Ø, "NOTES: "; "---":PRINT@277, "TMOUT: "; "-38Ø PRINT@289, "NR. OF ENTRIES: "N 39Ø IFN>6Ø THENCLS:GOTO16Ø 400 PRINT@32, "date"; : POKEL, 4: POK EM, 37: LINEINPUTDD\$ (1, X): SOUNDY, 1 :PRINT@46, "tm: "; "----":PRINT@5 2, "FREQ: "; "----" 410 POKEM, 49:LINEINPUTDD\$(2, X):S OUNDY, 1: PRINT@53, "freq: "; "----" :POKEM, 58:LINEINPUTDD\$ (3, X):SOUN DY, 1: PRINT@64, "call"; : POKEM, 69:L INEINPUTDD\$ (4, X): SOUNDY, 1: PRINT@ 78, "name: "; "----" 42Ø POKEM, 83: LINEINPUTDD\$ (5, X):S OUNDY, 1: PRINT@96, "qth: "; : POKEM, 1 ØØ:LINEINPUTDD\$(6,X):SOUNDY,1 430 PRINT@128, "rst:";::POKEM, 132 :LINEINPUTDD\$(7, X):SOUNDY, 1:PRIN T@138, "pwr: "; "----": PRINT@147, "M ODE: "; "----": POKEM, 142: LINEIN PUTDD\$(8, X):SOUNDY, 1:PRINT@147," mode: "; "----" 44Ø POKEM, 152: LINEINPUTDD\$ (9, X): SOUNDY, 1: PRINT@160, "notes: "; "-------": POKEM. 16 6:LINEINPUTDD\$(10,X):SOUNDY,1:PR INT@277, "tmout: "; "----": POKEL, 5: POKEM, 27: LINEINPUTDD\$ (11, X): SOUN DY, 1: N=N+1 450 PRINT@256, STRING\$ (30, 143):SO UNDV, 1: PRINT@417, C\$; N: PRINT@G, D\$:PRINT@H, B\$;:GOSUB120 46Ø IFA\$="#" THENN=X:GOTO16Ø 470 IFA\$<>CHR\$(13) THEN450 ELSES DUNDY, 1 48Ø NEXTX 500 ' REVISE/REVIEW FILE****

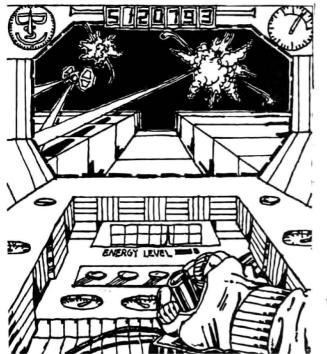
510 CLS:PRINT@129, "";:INPUT"DO Y

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OU WANT WHOLE FILE (WF) OR A SP ECIFIC DATE (SD)?";A\$ 52Ø IF A\$<>"WF" AND A\$<>"SD" THE N51Ø ELSE IF A\$="WF" THEN55Ø ELS 530 CLS:PRINT@129, "";:INPUT"INPU T DATE WANTED. FORMAT: -DD/YY"; SD\$(1,Ø) 54Ø N=Ø:SOUNDY, 1:FORR=1 TOX: IFSD \$(1,0)=DD\$(1,R) THEN570 ELSENEXT R: GOT016Ø 55Ø N=Ø 560 SOUNDY, 1: FORR=1 TOX 57Ø CLS:PRINT@5, "STATION LOG - W 4CNZ":PRINT@32, "DATE: "; DD\$(1,R): PRINT@46, "TM: "; DD\$ (2, R): PRINT@53 , "FREQ: "; DD\$ (3, R) : PRINT@64, "CALL : "; DD\$ (4, R): PRINT@78, "NAME: "; DD\$ (5,R):PRINT@96, "QTH: ";DD\$ (6,R):P RINT@128, "RST: "; DD\$ (7, R): PRINT@1 38, "PWR: "; DD\$ (8, R) 58Ø PRINT@147, "MODE: "; DD\$ (9,R):P RINT@160, "NOTES: "; DD\$ (10,R): PRIN T@277, "TMOUT: "; DD\$ (11, R): PRINT@2 89, "ANY CORRECTIONS? Y/N";: GOSUB 120 59Ø IFA\$="N" THEN63Ø ELSEIFA\$="Y " THEN600 ELSE IF A\$<>"N" OR A\$<

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MICROLOGIC

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December, 1902 >"Y" THENGOSUB120:GOT0590 600 SOUNDY, 1: PRINT@37, "(1) ;:PRINT@49,"(2) ";:PRINT@58,"(3) ";:PRINT@69,"(4) ";:PRINT@ ";:PRINT@100,"(6)";STRI 83, "(5) NG\$(22,32):PRINT@132,"(7) ";:PRINT@152,"(9) INT@142,"(8) ";:PRINT@166,"(1Ø)";STRING\$(19, 32):PRINT@283,"(11)" 61Ø PRINT@289, STRING\$(18, 32): PRI NT@289, "";: INPUT "INPUT ITEM NR: " ; NR: SOUNDY, 1: PRINT@289, STRING\$ (1 8,32):PRINT@289,DD\$(NR,R):PRINT@ 321, "":LINEINPUT"INPUT CORRECT D ATA: "; DC\$: SOUNDY, 1 62Ø DD\$(NR,R)=DC\$ 63Ø N=N+1:SOUNDV, 1:SOUNDY, 1:PRIN T@418,C\$;N:PRINT@G,D\$:PRINT@H,B\$;:GOSUB12Ø 64Ø IFA\$="#" THEN16Ø 700 IFA\$<>CHR\$(13) THEN630 ELSES OUNDY, 1: NEXTR 710 CLS:PRINT@65, "END OF FILE.": SOUNDY, 3: FORTM=1 TOW: NEXTTM: GOTO 800 ' SAVE FILE*** 810 CLS:PRINT@103, "DISK DRIVE RE ADY?":PRINT@164, "PRESS <ENTER> T O SAVE FILE";:PRINT@G, D\$: GOSUB12 82Ø IFA\$="#" THEN16Ø 83Ø IFA\$<>CHR\$(13) THEN81Ø ELSE8 40 84Ø OPEN"O", #1, "LOG/DAT: 1" 85Ø FORO=1 TOX:FORZ=1 TO11:PRINT #1,DD\$(Z,D):NEXTZ:IFO=X THEN87Ø 86Ø NEXTO 87Ø CLOSE#1:CLS:SOUNDY,5:PRINT@2 3Ø, "DISK SAVE COMPLETE.":FORTM=1 TOW: NEXTTM: GOTO160 900 ' LOAD FILE*** 910 CLS:PRINT@102, "DISK DRIVE RE ADY?":PRINT@163, "PRESS <ENTER> T O LOAD FILE.";:PRINT@G.D\$:GOSUB1 20 920 IF A\$="#" THEN160 93Ø IFA\$<>CHR\$(13) THEN91Ø ELSE9 40 94Ø OPEN"I",#1,"LOG/DAT:1" 950 FORI=1 TO60:FORZ=1 TO11:LINE INPUT#1, DD\$(Z, I): NEXTZ: IFEOF(1)T HEN97Ø 96Ø NEXTI 970 CLOSE#1:CLS:SOUNDY,5:PRINT@2 30, "DISK LOAD COMPLETE.":FORTM=1 TOW: NEXTTM: X=I:GOTO16Ø 1000 ' ADD TO FILE***

1010 F=1:N=I:GOTO310

1100 ' PRINT OUT FILE****

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All programs warrantied 60 days from date of purchase to original purchaser. Unless otherwise specified, shipping and handling \$2.00 per order. California Residents add 6% sales tax. COD orders accepted

1110 CLS:FORTM=1 TO3:SOUNDY,2:NE XTTM:PRINT@233,"IS PRINTER ON?": FORTM=1 TO9:SOUNDV,1:NEXTTM:PRIN T@G,D\$:PRINT@H,B\$;:GOSUB120 1120 IFA\$="#" THEN160 1130 IFA\$<>CHR\$(13) THEN1110 ELS E1140

1140 CLS:PRINT@355, "DO YOU WANT A HEADING? (Y/N)":PRINT@397,"";: PRINT@G,D\$;:INPUTE\$:IFE\$="#" THE NCLS:GOTO160

1150 IFLEFT\$(E\$,1)="Y" THEN1160 ELSE1190

1160 CLS:PRINT@289, "":INPUT"INPUT T START DATE";D1\$:INPUT"INPUT EN D DATE";D2\$

1170 PRINT#-2, CHR\$(31); CHR\$(16);
"18"; "W4CNZ STATION LOG": PRINT#
-2, CHR\$(30); "3501 SEA GULL RD. V
IRGINIA BEACH, VA. 23452 OP
ERATOR: B.B.WITHAM JR.": PRINT#-2
, "NOTE: -ALL TIMES IN 'UTC'."; TAB
(30) "START DATE: -"; D1\$; TAB(55) "E
ND DATE: -"; D2\$

118Ø PRINT#-2," SIGNATURE:-":PR INT#-2,STRING\$(8Ø,45):PRINT#-2:P RINT#-2

119Ø FORP=1 TO6Ø:IFX>1 AND P=X T HENP=6Ø:GOTO16Ø

1200 PRINT#-2:PRINT#-2, "DATE-"; DD\$ (1, P); TAB (16) "TIME-"; DD\$ (2, P); TAB (29) "FREQ-"; DD\$ (3, P); TAB (42) "CALL-"; DD\$ (4, P); TAB (56) "NAME-"; DD\$ (5, P):PRINT#-2, "QTH-"; DD\$ (6, P); TAB (42) "RST-"; DD\$ (7, P); TAB (54) "PWR-"; DD\$ (8, P); TAB (64) "MODE-"; DD\$ (9, P)

121Ø PRINT#-2, "NOTES-"; DD\$(10,P); "TMOUT-"; DD\$(11,P): PRINT#-2: IF P=11 OR P=22 OR P=33 OR P=44 THE N122Ø ELSEIFX>1 THENNEXTP ELSE FORTM=1 TO4: SOUNDY, 3: SOUNDL, 1: NEX TTM: GOTO16Ø

1220 PRINT#-2, STRING\$(8,13): IFX>
1 THENNEXTP ELSE FORTM=1 TO4: SOU
NDY, 3: SOUNDL, 1: NEXTTM: GOTO160

1300 ' EXIT ROUTINE***

1310 CLS:SOUNDV, 6:PRINT@168, "ARE YOU SURE ???":PRINT@G, D\$:PRINT@H, B\$;:GOSUB120

132Ø IFA\$="#"THEN16Ø

1330 IFA\$=CHR\$(13) THENCLS:PRINT @171," E N D":FORTM=1 TOW:NEXT:E ND





Education ...

Word Search Generates Learning as Well as Fun



Program development by Timothy J. O'Donnell

Spelling, as an exercise in rote learning, was never a lot of fun, if I correctly remember my childhood conclusion on the subject. I enjoyed reading, but vocabulary study seemed nearly as dry a process as spelling. Except, of course, when Miss Watkins taught us our words in the fifth grade. We boys would have gladly done anything for Miss Watkins — even study our spelling words! Unfortunately, she married a soldier from Ft. Knox and left school in the middle of the year.

We lost-and-pining young souls eventually struggled through, but our spelling and vocabulary words once more became dark and gloomy items, cloaked in uncertainty and hovering vaguely out of reach.

Of course, teaching methods have improved considerably through the years (Miss Watkins excepted), and the learning process governed by today's school systems has, in general, become far less tedious.

Part of the reason for this improvement in the lot of the young learner has been the introduction of the computer into the classroom, and the accessability of creative software such as the *Word Search* program recently brought to our attention by Timothy J. O'Donnell.

Mr. O'Donnell is a teacher at Buckeye Valley High School in Delaware, Ohio, and used the original version of this program in giving spelling and vocabulary instruction. To more closely fit his needs, and those of his students, he extensively rewrote the program, adapting it to the 80C.

Word search puzzles, if you happen not to be familiar with them, present you with rows and columns of letters, within which are hidden words along any vertical, horizontal, or diagonal axis, and written either backward or forward. As you find them, you circle them with a pen or pencil and move on to search for the next.

This revised version of the Word Search program will chart up to 39 characters wide, and columns of any reasonable length. You can enter as many words to search for as will fit in your chosen format. Also, you can print as many copies of your puzzle as you wish, making it ideal for the classroom. As you see, now, this program does require a line printer. A final, and extremely important aspect of the program is its provision for furnishing you an answer key to the puzzle.

Hopefully, many of you will find it entertaining and useful as an educational family game, or a valuable offering to any school which might employ the 80C in their classrooms.

Even programs such as Word Search can never replace Miss Watkins (or Mr. O'Donnell, either, for that matter), but they can stimulate learning by making it more fun. Of that I know Miss Watkins would approve. Obviously, Mr. O'Donnell does.

The Listing:

5 CLEAR: CLS: PRINT

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1Ø PRINTTAB(13) "PUZZLE" **40 PRINT** 5Ø PRINT" WORD SEARCH PUZZLE GE NERATOR" 16Ø PRINT@448," PRESS ANY KEY TO CONTINUE" 170 A\$=INKEY\$: IF A\$=""THEN170 200 CLS:PRINT 28Ø CLEAR 3ØØØ 310 PW=80 : REM PRINTER COLUMN WI DTH 33Ø PRINT"WHAT IS TO BE THE WIDT H OF THE PUZZLE (";PW/2-1; "MAXI MUM) ": INPUTW: MD=W: PRINT 34Ø IF W*2<PW THEN 345 343 PRINT"THAT WILL NOT FIT IN"; PW; "COLUMNS ":GOTO 33Ø 345 IF W<1 THEN 33Ø 348 PRINT 35Ø INPUT"WHAT IS TO BE THE LENG TH OF THEPUZZLE"; L : IFL>W THEN MD=L 355 IF L<1 THEN 35Ø 358 PRINT 36Ø INPUT"WHAT IS THE MAXIMUM NU MBER OF WORDS IN THE PUZZLE (M UST BE AT LEAST 2 WORDS"; M 37Ø IF M<2 THEN 36Ø 38Ø PRINT: INPUT"HOW MANY COPIES

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Software Color Computer TRS 80 Tandy Corp

DUUUII 1001, ...-OF THE PUZZLE DO YOU WANT (1 IS THE MINIMUM) ":NP 381 IF NP<1 THEN 38Ø 39Ø DIM A\$(L,W),W\$(M) 400 DIM W(M,3),DXY(8,2),DD(28) 4Ø5 CLS:PRINT 410 PRINT"ENTER A HEADING THAT W PRINTED OVER THE PUZZL ILL BE (";PW; "CHARACTERS MAXI MUM) ": INPUTH\$: PRINT 43Ø CLS:PRINT 44Ø PRINT"ENTER A WORD AT EACH Q MARK" : PRINT UESTION 45Ø PRINT"TO REDO THE PREVIOUS TYPE A HYPHEN (-)" :PR INT 46Ø PRINT"WHEN YOU RUN OUT OF WO TYPE A PERIOD (.) RDS " :PRINT 47Ø FOR I=1 TO M 474 PRINT 475 IF I=M THEN PRINT"*ONLY ONE MORE WORD CAN BE USED*" 479 PRINT 48Ø INPUT T\$: IF T\$="-" THEN I= I-1 : PRINT"REDO "; W\$(I); "...":G OT048Ø 49Ø IF T\$="." THEN 655 500 IF LEN(T\$)=0 THEN PRINT"INPU T ERROR; REDO "; W\$(I); "...": GOT 0 480 51Ø J=1 52Ø TE\$=MID\$(T\$,J,1):IFTE\$>="A" AND TE\$<="Z" THEN 570 525 IF TE\$<"A" OR TE\$<"Z" THEN 5 527 NID\$(T\$,J,1)=CHR\$(ASC(MID\$(T \$,J,1)+32) :GOTO 57Ø 53Ø IF TE\$=T\$ THEN T\$="": GOTO 5 8Ø 54Ø IF J=LEN(T\$) THEN T\$=LEFT\$(T \$,J-1): GOTO 57Ø 55Ø IF J=1 THEN T\$=RIGHT\$(T\$,LEN (T\$)-1): J=J-1 : GOTO 57Ø 56Ø T\$=LEFT\$(T\$, J-1)+RIGHT\$(T\$,L EN(T\$)-J): J=J-1570 J=J+1 : IF J<=LEN(T\$) THEN 5

58Ø PRINTI; "-"; T\$; "-" 600 IF LEN(T\$)<=MD THEN 610 605 PRINT"TOO LONG, TRY A SHORTE R WORD":GOTO48Ø 61Ø FOR IZ=1TO I=1 : IF W\$(IZ)<>

620 PRINT"YOU ENTERED THAT ONE A

TRY ANOTHER WORD": GOTO

T\$ THEN NEXT : GOTO 63Ø

63Ø W\$(I)=T\$ 64Ø NEXT I

LREADY

48Ø

655 CLS:PRINT

```
66Ø PRINT"THINKING"
68Ø FOR I=1 TO M-1
685 FOR J=I+1 TO M
69Ø IF LEN(W$(I)) < LEN(W$(J)) T
HEN HZ$=W$(I): W$(I)=W$(J) :W$(J
)=HZ$
700 NEXT J : NEXT I
71Ø FOR I=1TO8: READ DXY(I,1), DXY
(I.2):NEXTI
72Ø FOR I=1TO28 : READ DD(I) :NE
XT I
73Ø DATA Ø,1,1,1,1,Ø,1,-1,Ø,-1,-
1,-1,-1,0,-1,1
74Ø DATA 2,4,6,8,2,4,6,8,2,4,6,8
,2,4,6,8,2,4,6,8,2,4,6,8,1,3,5,7
75Ø FOR I= 1 TO M
76Ø LN=LEN(W$(I))
77Ø NT=Ø
79Ø SD=DD(RND(28))
800 SX=RND(W):X1=SX+(LN-1)*DXY(S
D. 1): IF X1<1 OR X1>W THEN 79Ø
81Ø SY=RND(L):X1=SY+(LN-1)*DXY(S
D,2): IF X1<1 OR X1>L THEN 790
82Ø NT=NT+1:IF NT<>W*L*2 THEN 85
83Ø CLS:PRINT:PRINT"COULDN'T FIT
 "; W$(I): PRINT"IN THE PUZZLE": PR
INT
831 PRINT"TO CONTINUE MEANS "; W$
(I):PRINT"WILL BE LEFT OUT"
832 PRINT:PRINT"DO YOU WANT TO C
ONTINUE (Y/N)"
```

```
833 A$=INKEY$: IFA$=""THEN833
834 IFA$<>"Y"ANDA$<>"N"THEN 832
835 IF A$="N" THEN 5 ELSE PRINT:
PRINT"CONTINUING"
836 W$(I)=" " : GDTO 95Ø
85Ø J=SY:K=SX
86Ø FOR P=1 TO LN
870 IF LEN(A$(J,K)) AND A$(J,K)
<> MID$(W$(I),P.1) THEN 79Ø
88Ø J=J+DXY(SD,2):K=K+DXY(SD,1):
NEXTP
900 J=SY : K=SX
910 FOR P=1 TO LN : A$(J,K)=MID$
(W$(I),P,1)
920 J =J+DXY(SD,2) : K=K+DXY(SD,
1) : NEXT P
940 W(I,1)=SX: W(I,2)=SY: W(I,3)
=SD
95Ø NEXT I
97Ø FOR I=1TOL
975 FOR J=1TOW
98Ø NZ=RND(9Ø)
982 IF NZ<65 THEN GOTO 98Ø
985 IF A$(I,J)="" THEN A$(I,J)=C
HR$ (NZ)
99Ø NEXTJ : NEXTI
1010 FOR I=1 TO M-1 : FOR J=I+1
1020 IF W$(I)<W$(J) THEN 1030
1Ø21 HZ$=W$(I) : W$(I)=W$(J) : W
$(J)=HZ$
1025 FOR K=1 TO 3: HZ=W(I,K) : W
```

TEXT EDITOR

By John Waclo



WORD PROCESSOR FOR THE COLOR COMPUTER

"This program is absolutely excellent" The bottom-line in Word Processors is printed output flexibility and TEXT EDITOR has it. TEXT EDITOR has Variable Text. Multi-Copy, and right-side Justification! Features that are hard to find in other widely advertised Word With Variable Text, you can Processors. repetitively generate the same text with predetermined changes in each output. Merge form letters with mailing lists using Variable Text. TEXT EDITOR's Multi-Copy command automatically does your letters and file copies. 50 copies of your address on mailing labels is a snap with Multi-Copy. Give your text that "professional" look with even right-side margins. It's easy, just select Justification on the Output Menu.

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\$49.95 Tape -- \$59.95 Disk ‡ Includes Manual ‡ Extended Basic required

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(I,K)=W(J,K) : W(J,K)=HZ : NEXT ĸ 1030 NEXT J : NEXT I 1040 GOSUB 2000 1050 CLS:PRINT 1060 PRINT"DO YOU WANT AN ANSWER KEY (Y/N)" 1070 X\$=INKEY\$:IFX\$=""THEN1070 1073 IF X\$<>"Y"ANDX\$<>"N"THEN 10 1076 IF X\$="N"THEN CLS:PRINT:PRI NT"FINISHED": END 1Ø8Ø H\$="ANSWER KEY" 1090 NP=1 1100 CLS:PRINT:PRINT"THINKING" 1110 FORI=1TOL:FORJ=1TOW:A\$(I,J) =". ":NEXTJ:NEXTI 112Ø FORI=1TOM 1130 LN=LEN(W\$(I)):J=W(I,2):K=W(I,1) 1132 FOR P=1TOLN 1134 A\$(J,K)=MID\$(W\$(I),P,1) 114Ø J=J+DXY(W(I,3),2): K=K+DXY(W(I,3),1):NEXTP 115Ø NEXT I 1160 GOSUB 2000 1165 PRINT#-2," " 1170 CLS:PRINT:PRINT"FINISHED":E ND 2000 FOR H=1TONP 2Ø1Ø T=(PW-2*W)/2 2020 FORI=1TO3:PRINT#-2," ":NEXT

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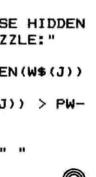
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2030 PRINT#-2, TAB((PW-LEN(H\$))/2);H\$ 2Ø4Ø PRINT#-2," " 2050 FOR J=1 TO L 2060 PRINT#-2, TAB(T); 2070 FOR K= 1 TO W 2080 IF A\$(J,K)=". " THEN PRINT# 2090 IF A\$(J,K)=". " THEN 2110 2100 PRINT#-2, A\$(J,K);" "; 211Ø NEXT K 212Ø PRINT#-2," " 213Ø NEXT J 214Ø PRINT#-2," " 215Ø PRINT#-2, "FIND THESE HIDDEN WORDS IN THE ABOVE PUZZLE: " 216Ø PRINT#-2," " 217Ø FOR J=1 TO M: IF LEN(W\$(J)) =Ø THEN 22ØØ 218Ø IF POS(-2)+LEN(W\$(J)) > PW-2 THEN PRINT#-2," " 219Ø PRINT#-2, W\$(J), 2200 NEXT J : PRINT#-2," " 22Ø5 NEXT H 221Ø RETURN



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object of the game is to drive 700 miles, while avoiding accidents, tire blow-outs, detours, etc. Lots of fun!

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Word Processing ...

This Graphic Printer Will Give You A New Typeface



By Ross Chamberlain

The typeface that comes with the Line Printer VII and VIII is nice, but it doesn't do everything. For one thing, the VII does not have descenders in lower case and both faces lack something in their looks.

I wondered whether these two printers could be "converted" to use their dot-addressable graphics to do word processing. After a few starts, I came up with the program listed below, which I think handles things pretty well.

What we have here is simply a program which allows me to write letters in any typeface I want. Of course, each face must be programmed in—but I like this one very much. It is, admittedly, somewhat slow in the processing, but I do believe the results to be very satisfying.

You will see, also, that you will get a form of "justification" to even right hand margins when running this program. There is no need to be concerned about where to break off a line—just keep typing. When a space or hyphen is encountered, the printer will automatically end the line. Use the ENTER key for ends of paragraphs (or blank lines). This is not perfect, however, and some of the lines tend to stick out something like the proverbial lonesome pine. Still, I think it is better to have CoCo decide the line length than try to figure it out yourself on a 32-character screen going to an 80-character printer.

I hope you will enjoy this program and that it may lead you to designing typefaces of your own choosing. I have already designed another one—sort of like changing print

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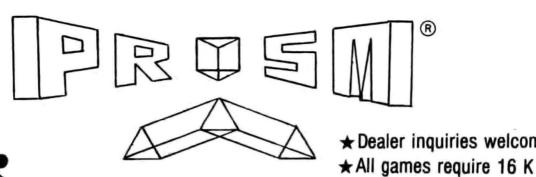
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wheels in a Daisy Wheel printer.

The listing:

1 '/\/\/\/\/\/\/\/\/\/\/\ 2 'TYPEFACE II < 3 ' C. ROSS CHAMBERLAIN < 5 6 7 PCLEAR 1:CLEAR 2000 8 DIM A\$(91),A(91) 9 CLS:PRINT:PRINT" LDA D I N G":PRINT:PRINT" TYPEFACE III" 10 A(1)=3: CSPACEBAR] 11 DATA 128,128,128 2Ø A(2)=2:' 21 DATA 207,128 3Ø A(3)=4:' " 31 DATA 135,128,135,128 4Ø A(4)=6: * # 41 DATA 148,255,148,255,148,128 5Ø A(5)=8: * \$ 51 DATA 132,170,255,170,255,170, 144,128 6Ø A(6)=8: % 61 DATA 199,165,147,137,229,211, 241,128 71 DATA 176,202,197,205,178,160, 208,128 8Ø A(8)=3:' ' 81 DATA 133,131,128 9Ø A(9)=4: 91 DATA 156,162,193,128 100 A(10)=4:) 1Ø1 DATA 193,162,156,128 11Ø A(11)=6: * 111 DATA 132,149,142,149,132,128 12Ø A(12)=6:' + 121 DATA 136, 136, 190, 136, 136, 128 13Ø A(13)=3:' 131 DATA 208,176,128 14Ø A(14)=5:" 141 DATA 136,136,136,136,136 15Ø A(15)=3:7 151 DATA 224,224,128 16Ø A(16)=6: 7 161 DATA 224,144,136,132,131,128 17Ø A(17)=6:' Ø 171 DATA 190,193,193,193,190,128 18Ø A(18)=6: 1 181 DATA 196,194,255,192,192,128 19Ø A(19)=6: 2 191 DATA 226,209,201,201,198,128 200 A(20)=6: 3 201 DATA 161,193,201,205,178,128 21Ø A(21)=6: 4 211 DATA 152,148,146,249,144,128 22Ø A(22)=6:7 5

221 DATA 175,197,197,197,185,128



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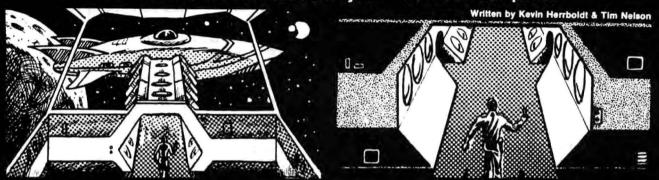
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, 145, 128 37Ø A(37)=8:' D 371 DATA 193,255,193,193,193,162 , 156, 128 38Ø A(38)=8:' E 381 DATA 193,255,201,201,221,193 ,227,128 39Ø A(39)=8:' F 391 DATA 193,255,201,137,157,129 , 131, 128 400 A(40)=8:' G 4Ø1 DATA 156,162,193,193,2Ø5,186 ,201,128 41Ø A(41)=9: ' H 411 DATA 193,255,201,136,136,201 , 255, 193, 128 420 A(42)=4:' I 421 DATA 193,255,193,128 43Ø A(43)=7: J 431 DATA 160,192,193,193,191,129 , 128 44Ø A(44)=9; ' K 441 DATA 193,255,201,132,139,209 ,225,192,128 45Ø A(45)=8: L 451 DATA 193,255,193,192,192,192 ,224,128 46Ø A(46)=12: M 461 DATA 193,255,193,130,132,152 , 132, 130, 193, 255, 193, 128 47Ø A(47)=1Ø: N 471 DATA 193,255,193,130,132,136 , 145, 255, 129, 128 48Ø A(48)=8:' O 481 DATA 156,162,193,193,193,162 , 156, 128 49Ø A(49)=8: P 491 DATA 193,255,209,145,145,145 , 142, 128 500 A(50)=8: Q 501 DATA 156,162,193,209,209,162 ,220,128 51Ø A(51)=9: R 511 DATA 193,255,201,137,145,169 ,198,192,128 52Ø A(52)=8:' S 521 DATA 198,169,201,201,201,202 ,177,128 53Ø A(53)=8:' T 531 DATA 131,129,193,255,193,129 ,131,128 54Ø A(54)=1Ø: 'U 541 DATA 129,159,161,192,192,192 , 161, 159, 129, 128 55Ø A(55)=1Ø: 'V 551 DATA 129,143,145,160,192,160 , 145, 143, 129, 128 56Ø A(56)=12: W 561 DATA 129,159,161,192,160,156 , 160, 192, 161, 159, 129, 128

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INTRODUCING:

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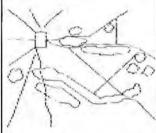
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901 DATA 162,198,170,144,138,134 ,130,128 91Ø A(91)=6: z 911 DATA 166,178,170,166,178,128 920 FOR A=1 TO 91:FOR B=1 TO A(A): READ C: A\$ (A) =A\$ (A) +CHR\$ (C): NEX T B.A 1000 GOSUB 1110 1010 CLS:PRINT:PRINT"READY FOR C OPY" 1020 LINE INPUT A\$ 1030 B\$=A\$:IF B\$=""THEN GOSUB 11 10:GOTO 1020 1040 FOR A=1 TO LEN(B\$) 1050 L\$=MID\$(B\$,A,1) 1060 IF L\$=CHR\$(10)THEN L\$=CHR\$(96) 1070 B=ASC(L\$)-31:PRINT#-2,A\$(B) :: H=H+A(B) 1075 IF H<=360 THEN 1090 1080 IF L\$=CHR\$(32) OR L\$=CHR\$(4 5) OR L\$=CHR\$(47) THEN GOSUB 111 1090 NEXT A 1100 GOTO 1020 111Ø PRINT#-2, CHR\$ (3Ø) 112Ø H=Ø:PRINT#-2, TAB(5); CHR\$(18 113Ø RETURN

Software Review ...

Across The Rubicon Is Good War Game For 80C

I admit that I am fascinated by war games. And, in my time, I have bought a bunch of them: D-Day, Gettysburg, Waterloo and the like. I even subscribe to a war game magazine, Strategy and Tactics, which provides a different game each month.

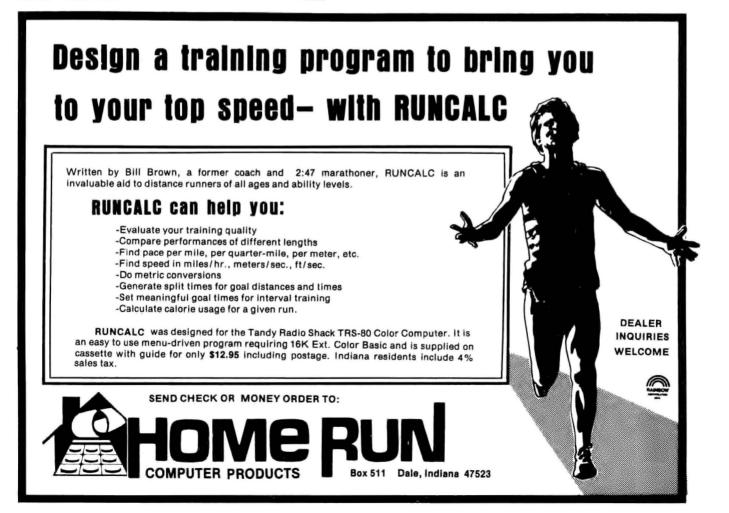
Alas. The problem with war games is that you have to have another wargamer to play them with you. The idea is excellent: That you can (might) be able to change the course of history by being much smarter than Gen. Lee or Napoleon. Its a perfect "what if" situation.

What if... Napoleon had brought up his reserves in time. What if... the German high command had not been convinced the landings in out-of-the-way Normandy were not the real thing on June 6? What if... the Union troops had fallen back under Pickett's charge? War games let you play a lot of "what ifs." I have always been convinced they are more historical than militaristic.

But, like I said, you need someone to play them with you. Some of these games are designed to be played solitare, but that takes a lot of the tactics and planning out of them. After all, can some dice be as smart as a human? Nope.

How 'bout a nice, friendly, clear-thinking CoCo? Well, that's another story and a worthy opponent indeed is our little friend, the Color Computer.

When Across The Rubicon arrived, the opportunity was there to finally play a war game with someone who was as interested in it as was I. And the scene of battle was a



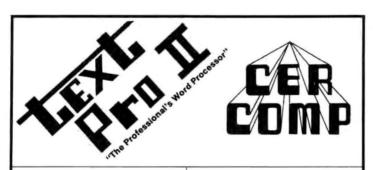
challenging one, indeed. The Huetgen Forest, which the allies called the "death trap." The forest blocked the approaches to the mightly Rhur-the heart of Germany's war machine. But there was a trump card, too. Hitler hoped to tie the allies down long enough in the woods and hills of the Huetgen to gather his forces for the one last battle that he expected to win and turn the tide of the war again. This was because the Forest was designed as a holding action that would precede the Ardennes Campaign-known as the Battle of the Bulge.

Enough of history, except to say Across The Rubicon is historically sound. Except that the allied player has the option to choose his troops to a degree, the units present in the campaign are generally of the same strength as those which were present.

As to the game itself, it is challenging. For those of you who have never played a war game before, don't expect a page or two of instructions and a great deal of improvision. Across The Rubicon boasts 12 pages of instructions and even includes hints on movement and strategy. Units can move based on their strength and abilities.

The essential war game elements are all here: The necessity for troops to be kept in supply, the use of air strikes and artillery. If you "gang up" on enemy troops, you have a better chance of winning. There are infantry units, light and heavy tanks and parachute drops, too.

Each unit can move a certain amount of space in a given turn-roughly three days in historical time. There are certain objectives you must attain to win the game, and they must be attained in a certain amount of time. When engaging in combat itself, it's not just a "you win/they win" situation—you can lose some of your men and deplete your



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unit's strength. The unit still exists, but with a lowered ability to do anything.

As to the game itself, it is easy to play, considering the complexities of war games in general. CoCo makes things a lot easier by keeping track of positions, strengths, supply, move factors and the like. By using a map with various symbols on it, you get a good picture of what the battlefield looks like, although it is somewhat difficult to tell which unit is which without any kind of a grid (which is not available with a low res game board such as that used here).

As with anything else as complicated as this, the first run through the game is for learning. The second is to play. There are four levels of difficulty.

If you are interested in war games-or think you might be-then Across The Rubicon is for you. It is both enjoyable and playable and has the added bonus of teaching a little slice of history.

How did we do? We made the mistake of trying to attack in three columns, used up our air support too early and ended up running out of artillery. We got creamed. But there is always next time. Now let's see, what if we ...

(Ark Royal Games, P.O. Box 14806, Jacksonville, FL 32238, \$16.95)

Software Review ...

Get On The Horn With Your Own Bulletin Board

So, you've been calling bulletin boards around the country, hooking up to CompuServe and just having a ball with the telephone, a modem and your CoCo. But, once you have called them all, what can you do?

You can call back, of course. And, make a lot of friends and learn a great deal of good information. But, what you'd really like to do is have people call you!

With this bulletin board software, you can have your own bulletin board. Now, people can call you and you can operate your own system.

Installation of the bulletin board system is a fairly easy one. Disk drives are necessary (two at least, three if you wish to allow graphics to be loaded to and from your system). You also need an auto-answer modem (see some reviews in the November Rainbow), a printer and, last but certainly not least, a CoCo.

Once you have this together, installation of the bulletin board is a fairly simple affair. Since the program is in machine code, it is not hard to modify, but you will be able to choose from a number of options. That being done, call your best computer friend and let him or her be the first to get "one line" with you. Also, let the Rainbow know about your existance-we'll print your number and hours of operation. We're dedicated to helping further information about the Color Computer and TDP-100.

The investment in all of this is not inconsiderable, especially the hardware. But, you can have a sophisticated bulletin board in operation and working with this fine software package.

It provides many of the features you have seen in other bulletin boards-menus, message files, log on messages and the like. If you always wanted to be a SYSOP (SYStem OPerator), we believe you will find this to be an enjoyable experience.

(Spectrum Projects, 93-15 86 Drive, Woodhaven, NY 11421, \$149.95)

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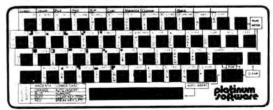
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You're Serious About Your Color Computer* SO ARE WE, Software Review ...

Colorpede Provides Bug-Eyed Excitement

Games for the 80C are becomming more sophisticated by the moment, it seems, and in its own splintering, serpentine way, *Colorpede* meanders to the forefront of the pack of the slithery play-alikes based on that arcade favorite, *Centipede*.

I thought the color and graphics of this total machine language feature were excellent. The sound effects, though not quite the 'arcade quality' advertised in the accompanying brochure, were adequate; but even if they weren't, there's so much action on the screen it's my bet you wouldn't notice. In fact, the first several times I played Colorpede I forgot to turn on the sound altogether and still thoroughly enjoyed it.

Of course, of major importance to a game of this sort is its 'playability,' or response to your commands. *Colorpede* uses either keyboard or joystick input, and both give you excellent control. I found this to be true even though my keyboard digitation is a bit arthritic.

Most of you, I'm sure, are familiar with the basic format of this game, but I'll give you a general runthrough, anyway,

and try to point out some of the particulars.

Colorpede takes about a minute to load from cassette (its also available on disk) and gives you a display of the action automatically while waiting for you to start the game. For keyboard control, hit 1 or 2 to determine the number of players. The four directional-arrow keys are used to control the shooter, and the shift key is used to fire. The game may

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be paused anytime during play by hitting the space bar, and resumed by hitting the shift key. If you're using joysticks, hit the left joystick's trigger button to signify one player, the right one for two.

Each player begins with three shooters, which are displayed at the top of the screen next to the player's score. You're granted an additional shooter for each 10,000 points you score, up to a total of seven each game. (I'm still looking for my fourth shooter, but getting closer!)

The elements of the game, other than the shooter, are the toad stools, a bedeviling bouncing bug (whose points vary according to how close he is when you shoot him), the free-jointed colorpede's head and body parts, a beetle, who roams about planting more toad stools, and a stinger, who occasionally runs across the screen poisoning toad stools to complicate the game.

This one doesn't come cheap, but it should pay for itself by keeping your kids (or you) out of the arcades for awhile.

(Intracolor Communications, P.O. Box 1035, East Lansing, MI 48823, \$29.95 on tape, \$34.95 disk)

-Courtney Noe

Software Review ...

Semi Draw Will Give You Great Color Sketches

For those of you who liked the Rainbow's cover illustration in November, you can draw pictures just as colorful with the same Semi Draw program we used to produce it.

Honestly, credit for producing the picture itself must go to author Paul Hoffman, who did the rainbow that is included as one of the examples in the Semi Draw program package. We just added the word "Graphics" and the exclamation mark at the bottom of the picture.

(The cover credit on page 3 in November incorrectly identified the program which produced the color picture as Foxy Graf, another new offering from Computerware. We regret the error.)

Semi Draw gets its name from the type graphics it uses, the semi graphics modes. These are accessed through machine language subroutines in a Basic program and have the advantage of allowing the user to mix both text and graphics by using CoCo's built-in character generator. Also, by using screen switching, the user is able to make his pictures move. As an example, the entire program used for last month's cover actually has the rainbow arcing across the screen until it makes a complete arch as shown in the photograph.

Semi Draw is extremely easy to use. By merely pressing number keys to indicate colors, you can set or reset pixels in any of eight colors. The arrow keys are used to position a graphic cursor, or you can use joysticks. The joysticks are faster but the arrow keys give better control.

Each picture can be saved to tape, or, as a matter of fact, an entire set of screens can be saved. If you have drawn several screens to animate the picture, you can just ask the program to page through the screens—and you have animation.

Semi Draw is a high quality program which will allow you to do a great number of things with graphics. It is easy to use and understand. In addition, the documentation does a good job of describing the program's features.

(Computerware, Dept. C, Box 668, Encinitas, CA 92024, \$21.95)

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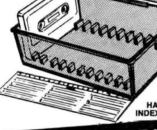
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Education ...

Education Views the Vital Software Connection

Last month we discussed the educational administrator and the color computer. We noted that the color computer is a "best buy" for schools. The next problem, once you have the computer, is where to obtain software that is appropriate for student use. At this point, Radio Shack has not made the necessary commitment toward the use of the color computer in schools by supplying appropriate software for student use. There is a potential solution on the horizon, however.

Follett Library Book Company has just announced a major effort for computer users in the schools. Andy Larson, Director, Microcomputer Division, has been working diligently on behalf of color computer users. Many of the programs that are available for Apple Computer users are being converted for the use of Radio Shack color computer owners. The new program at Follett is a major undertaking, and within the next six months should provide schools all the software necessary to implement a computer literacy program for grades K-12.

The Follett program should not be interpreted as exclusively the only source for color computer software. Our school district has found that software from some of the Rainbow advertisers, such as Tom Mix, Sugar Software, B-5, and Strawberry, all have programs that can work well in the classroom. It should be emphasized, however, that some companies are producing material that is not appropriate for student use. We cannot emphasize enough the importance of reviewing all programs prior to their purchase. If, in fact, an educational network is going to be established for color computer users, it is important that we review the material, have students use it and react, and finally, get teacher recommendations.

In addition, some distributors have materials that are excellent for school use. The new book, TRS-80 Color Computer, distributed through John Wiley and Sons, would be an excellent textbook. Programs with word processing, as distributed through Cognitec, can be most useful for teachers, and help them make greater use of the computer. Further, the new Color Pilot by Radio Shack has considerable application for the schools.

Back to Follett-there are six features to the new Follett "Quality Courseware" program.

First, their representatives are emphasizing that only the best software available will be included in their catalog. Each of the programs has received positive evaluation and

By Dr. Paul Kimmelman Assistant Superintendent Norton (Ohio) City Schools and

David Macali, Coordinator of Instructional Services Norton City Schools

review by educators thoroughly experienced in computerassisted learning.

Second, the new catalogue will include only programs that fit your microcomputer. Catalogues will be printed to each school district's specifications and will contain only programs compatible with their equipment.

Third, program listings will be continuously updated and printed on demand. What this means is that you can specify which month you want your catalogue printed and for which hardware. The advantage of this service will be that you will get a truly current catalogue. New programs are produced, old ones deleted, and updated prices included. In essence, school districts will be able to request from Follett a monthly catalogue with everything being updated.

Listings arranged by subject area, with grade levels specified, will be the fourth feature of the "Quality Courseware" program. To make program selection easy, Follett has arranged the catalogue in the order that most educators prefer. Selections will be divided by subjects such as language arts, reading, math, science, computer literacy, etc. Grade levels will be indicated with each program listed. Unquestionably, this will be a time-saver for those responsible for ordering software.

Fifth, catalogue kits with custom-printed pockets will be available for all courseware. Librarians and media specialists have often been disappointed to learn that cataloguing was not available for software offered by other suppliers. With the new Follett program, complete catalogue kits and do-it-yourself cataloguing have been developed for the programs in the catalogue. They will even print each pocket with your school name, or whatever wording you indicate.

Lastly, all orders will be shipped free whether they are prepaid or billed. This is a distinct advantage to financially hard-pressed school districts. We think that Follett and its new commitment to the color computer will be a tremendous boost to school districts using the color computer. In the next few months, Follett will be distributing programs for pre-school and kindergarten children such as "Mop Town" and "Bumble Bugs." Our preliminary review of the Bumble Bugs program is that it will be outstanding for primary student use. Our hats are tipped to the Follett representatives.

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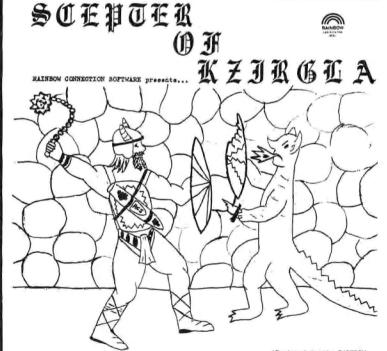
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Going Forth With Two Fine Compilers

By Dr. Laurence Preble

What's faster than a speeding FOR-NEXT loop? More powerful than an interpreter? Able to leap complex algorithms with a speed bound? A compiler, naturally. Today, I am going to tell you about two new compilers for our Color Computer; but first a word about the alternatives to compilers.

Extended COLOR BASIC is a powerful programming language. It is easy to learn and comes with the computer. Also, it is slow. Notice how much of the really great commercial software is written in Assembler code. Any interpreter is slow because of the way it works—Each program statement is interpreted and executed each time it is encountered. A single command may translate into dozens of machine codes (the native language of the computer).

Assembler is fast. Assembler is a compact and very powerful. Also, it is hard to learn and use. Even those who know and love Assembler, will tell you that it takes many times longer to write a complex Assembly Language program than to write a comparable program in BASIC. Assembler is fast because each command translates directly into a single machine code. There is a one-to-one correspondence. Working with the native language of the computer means that very efficient use of the machine is possible, hence speed. The difficulty is that every type of computer has a totally different native language. Also, Assembly language is even more basic than BASIC. If you want to print the word "HELLO" in BASIC, you can simply tell the computer PRINT "HELLO" and it does it. An equivalent in Assembly Language might go something like this:

LEAX HISTR,PCR LBSR PDATA JMP CONTROL HISTR FCC 'HELLO FCB \$D, \$A, \$4

Many feel that Assembly Language is worth the extra effort when they want their graphics to really zip across the screen.

Enter, the happy medium, the compiler. A compiler shares the high level ease of programming like BASIC and much of the execution speed of Assembly Language. A compiler translates a programming command only once. Native machine code is generated and stored for future use. Hence a compiler has much of the ease of programming of any high level language but also much of the execution speed of Assembly Language.

It is possible to make a compiler for any language. There are BASIC, ForTran, Algol, Pascal and many other languages implemented as compilers. Forth is a relatively new entry. It was designed by an Astronomer, Charles H. Moore in 1969. In 1973, commercial distribution and support was begun by Forth, Inc. FIG (Forth Interest Group) formed in 1978 to promote the use and development of the new language.

Okay, enough hist

Okay, enough history. Let's go Forth! Forth is best described as a combination of interpreter and compiler. Commands can be translated and executed in one step. Commands can also be stored and recalled in their compiled form without further interpretation. That is why Forth is fast when compared with BASIC.

Forth is a little odd, though. You see, Forth was designed to take maximum advantage of a computer's internal



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PRINT 2 + 3 + 7 (enter)

And the answer appears below:

Reverse Polish Notation requires data entry like this:

237 + + (enter).

Forth's rough equivalent of BASIC's "PRINT" is the "." or period.

So in Forth we would say:

237 + +, (enter)

And the answer appears below:

Like I said, RPN is a little odd at first glance; but that is just because we are not used to it. Practice makes RPN second nature

The basic unit jof action in Forth is a WORD. There are no line numbers to demarcate our instructions. Instead, programming consists of defining words to be used by Forth. Once a word is defined, it is yours forever (or at least

until you tell Forth to FORGET it). Let's define a word that will multiply any number by two and then print the result: : TIMESTWO 2 * . ;

The colon signifies the beginning of a definition. TIMESTWO is the word we are defining. 2 * does the actual multiplication. The "." does the printout. The semicolon signifies the end of the definition.

Now we enter:

7 TIMESTWO (enter)

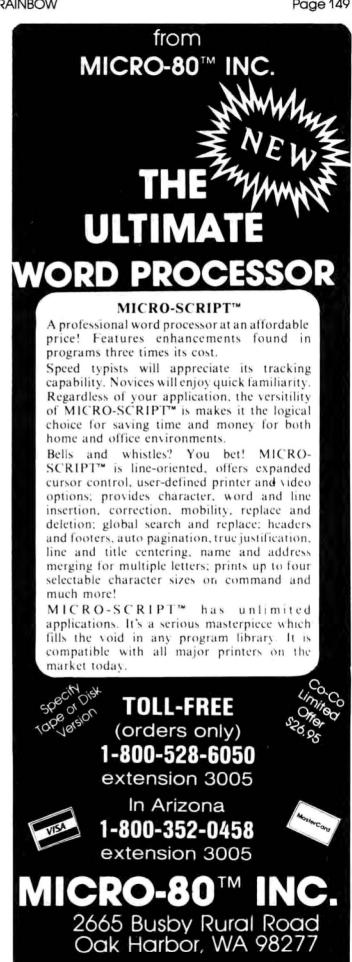
And we get: 14

Once a Forth WORD is defined, it can be used in the definitions of more Forth WORDS. Programming begins with simple definitions and evolves into the more complex. A highly complex program could be embodied in a single Forth WORD. To invoke a program, its Forth WORD is simply typed in on the terminal. Execution begins.

Forth, by nature, is a language that is never completely defined or "finished." That is because new WORDS can continually be defined; once defined, they become part of the language. There are several hundred Forth WORDS that are considered standard, at present. Nontheless, Forth novices are usually surprised by the seeming lack of some of their favorite functions. Don't fret! If a function is missing, it can nearly always be constructed from the existing Forth vocabulary. If super high execution speed is required, Forth even has a provision for defining new vocabulary with Assembler code.

I should mention here that integer arithmetic only is considered standard with Forth. Surprised? Remember, if you really need floating point functions there are available methods for making them. Anyway, floating point operations are inherently much slower than integar operations. Most experienced Forth programmers find that they can do without floating point.

Disk usage by Forth is a little different too. Forth divides its data blocks into SCREENS instead of the more familiar file structure. A SCREEN is simply all the data that will fit on your television screen at one time. Each SCREEN of data or Forth definitions is given a number and stored sequentially on disk. Each SCREEN may contain numerous Forth WORDS. When a SCREEN is LOADed, all the vocabulary contained on the SCREEN becomes part of the sytem's current vocabulary. It is common practice to use several of the initial SCREENs on disk to store an index or



Distributors Wanted

catalog of the remaining SCREENs which contain the Forth vocabulary.

Mr. Falk has graced me with two versions of Forth written for the TRS-80 Color Computer. ccForth was written by Charles Eaker, Ph.D and distributed by Frank Hogg Laboratory, Inc. Color-Forth was written by Hoyt A. Stearns and is distributed by Hoyt Stearns Electronics. Up to this point, everything I have said about Forth applies to each author's version of Forth. Differences exist mainly on three points: (1) Method of installation, (2) Supplied documentation and (3) Enhancements or extra Vocabulary.

Installation

ccForth is supplied on disk, Color-Forth on tape or ROM. Both versions allow disk operations when installed. However, Color-Forth by Stearns can also be used on a system without disk, programs being stored on tape, if desired.

The installation of ccForth is quite straightforward. First, make a backup copy of the supplied disk using BASIC's standard BACKUP command. This is not strictly required, but definitely a good idea with any new software. Put away the supplied disk in a nice safe place in case something terrible should ever happen to your new copy. Put your new disk into drive 0 and enter LOADM"CCFORTH" and hit the enter key. When your computer says "OK," type EXEC and hit the enter key. That's it! Forth comes on with a signon message and away you go.

Installation of Color-Forth by Stearns is a little more involved but not difficult. Place the supplied cassette in the reader and type CLOADM (and hit enter). If you have purchased the ROM version, install the ROM according to supplied instructions. Next, for those who have disk, place a newly-formatted disk in drive 0 and type EXEC (and hit enter). This begins construction of a Forth disk. Type TAPE 90 LOAD (and hit enter). Then hit any key except BREAK

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or F to read SCREEN 90 from tape then hit any key again after you see "ID" 90. Color-Forth will do the rest. Now that a Color-Forth disk has been constructed, future sessions with Color-Forth may be initiated by installing the disk in drive 0 and typing:

DSKI\$ 0,0,1,A\$,A\$ (hit enter)

EXEC 1536 (hit enter)

To execute Color-Forth from ROM type EXEC & HE000 (or & HE002 for cold start) and hit the enter key. To execute Color-Forth from RAM type EXEC & H988 (or & H98 A for cold start) and hit the enter key.

Extra Color-Forth vocabulry can be loaded from tape or disk as desired.

Documentation

The package supplied by Stearns will not teach you the Forth language if you are a novice. The implementation of Forth itself is excellent and has some unique features; however, the documentation supplied assumes you either already know Forth or are willing to purchase one of the introductory books available. Mr. Stearns, in his preface to the Color-Forth manual, suggests contacting the Forth Interest Group and receiving their magazine: Forth Dimensions. The documentation supplied for Color-Forth describes mainly the differences and enchancements of

Color-Forth by comparison to the standard Fig-Forth.

Frank Hogg and Chuck Eaker took a different tack with ccForth. It is assumed that you know zip about Forth. A well-written manual of just over 200 pages takes you through all the ground work necessary to understand the language. The manual makes use of some comparisons to BASIC; so it is helpful if you at least know a little BASIC.

Enchancements

Both ccForth and Color-Forth are supplied with considerable enhancements over the accepted standard Forth. Enhancements consist of extra vocabulary.

Eaker's ccForth includes an Assembler vocabulary, a choice of line-oriented, block-oriented or screen editors, a disk file access program and a game or two. This version of Forth also includes enough string functions to duplicate most of the functions allowed by Extended Color Basic. WORDS uniquely useful to the control of the Color Compter's graphics capabilities are also included. Forth WORDS for the composition of computer music and arcade sounds are an extra freebie.

Stearns Color-Forth allows the inclusion of machine code within a Forth definition but no standard Assembler vocabulary is included. An excellent screen-oriented editor is supplied with complete instructions on its use. There are some truly unque features. Color-Forth handles interrupts cleanly in high level Forth. That means interesting timesharing possibilities. A TIME-OUT function is useful in debugging your Forth definitions (programs). An interruptdriven timer is set before executing your program. If your program goofs and enters an infinite loop, Forth will seize control when the predetermined time has expired. Color-Forth also includes a useful program execution trace function. Type TRON and your computer will show you exactly how your program is running. It will even trace the execution of Forth itself. Color-Forth also includes several WORDS for cotrolling the various graphics features of the color computer.

Both of these Forth compilers have some interesting features. Also, remember that nearly any feature found on one version of Forth could be duplicated on another version

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by Mark Zimmerman and Ed Pollard



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This 9-color joystick game is not a "BREAKOUT" but a new idea. You are shooting down the bricks to get the "enemy" on the other side. But when you shoot through "the wall" and miss him, points are subtracted. No "ball and paddle," but you shoot bricks at the bricks. This one's unique. 9 colors and sound. Time limit on game play. Joysticks required. \$6.95

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SOFTWARE CONCEPTS DIMENSIONAL SOFTWARE

105 Preston Valley Shopping Center Dallas, Texas 3954 Clairemont Mesa Blvd. San Diego, California of Forth if you are willing to write the definitions needed.

Renchmarks

Earlier, we mentioned speed. We know a compiler is supposed to be fast; so, how about a race? Let's pit cc Forth against Color-Forth. Also, in case anyone is interested, let's include Extended Color Basic in the lineup.

In order to have a race, we need a goal. In this case, I chose to let the constestants sprint to find all the prime numbers less than 300. For those of you who are a little rusty on high school math, a prime number is any number than can only be evenly divided by 1 and itself. The numbers 3, 5 and 7 are a few examples.

there are many ways of testing to see if a number is prime. The most inelegant, brute-force method I know is to simply divide the number in question by every single positive integer below it except the number 1. For example, to test the number 5 we would do the following divisions: 5/2, 5/3 and 5/4. Since none of the divisors produce a whole number quotient, 5 must be prime. Okay, experienced programmers and mathematicians, I hear that snickering. Sure, there are numerous programming tricks that could be used to improve this algorithm by many magnitudes of efficiency. Never mind that. This is intended to be an obstacle course, a test of brute strength and agility.

Here is my implementation:

: TESTPRIMÉ DUP 2 DO DUP I MOD 0 = IF DROP 0 LEAVE ENDIF LOOP ;

: PRIMES BELL 2 DO I TESTPRIME DUP IF. ELSE DROP ENDIF LOOP BELL;

TESTPRIME is my Forth definition that tests to see if any given integer is prime. PRIMES is my Forth definition which allows the user to input a number and then uses TESTPRIME to check every integer less than the entered

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number for membership in the prime number series. PRIMES also makes a beep at the beginning of the race and sounds a beep at the end of the race. A cheap digital watch is used to time the event. To start the race I type:

300 PRIMEs (and hit the enter key)

Then I time and wait—but not long!

Color-Forth comes in first with a time of 13 seconds. ccForth comes in second with a time of 22 seconds.

Now it's time to let BASIC run its laps. Oops, when I type in 300 PRIMEs, all I get is SN ERROR! Since BASIC doesn't speak *Forth* we need a reasonably equivalent algorithm. To wit.

10 INPUT N

20 SOUND 100,1

30 FOR X=2 TO N-1

40 FOR Y=2 TO X-1

50 IF X/Y-INT(X/Y) 0 THEN NEXT Y ELSE 70

60 PRINT X;

70 NEXT X

80 SOUND 100,1

Timing method is the same. Interesting. BASIC took two minutes and 36 seconds to complete its task.

To be fair about it, benchmark programs are not easy to design with equity for all compiler or interpreter implementations. A given implementation may shine when given a benchmark algorithm which takes advantage of its most efficient features. The same implementation may do poorly when asked to perform a less than optimum task. For example, BASIC does not include provisions for integer arithmetic. That two minutes and 36 seconds race included the overhead time required to drag around floating point numbers.

Why Go Forth?

Is it worth the effort to learn a new language? It depends on what you want from your computer. If you want fancy interactive game programs where speed is not a criterion, if you want to do high precision number crunching with floating point and scientific notation then stick with BASIC. It was designed to do the job. However, if speed is your main requirement or if laboratory systems control is your aim or if code compactness is required then Forth is an excellent alternative to BASIC or Assembly Language.

Which Forth implementation is best? Again, that depends on your personal requirements. They are both fast. But for the highest execution speed I would choose Hoyt Stearn's Color-Forth. As a novice, I would choose ccForth by Chuck Eaker because of the excellent documentation included; frankly, my first serious introduction to Forth was Mr.

Eaker's very complete manual.

(Color-Forth, Hoyt Stearns Electronics, 4131 E. Cannon Drive, Phoenix, AZ 85028, \$58.95 for RAM, \$123.00 for ROM and RAM; ccForth, Frank Hogg Laboratory, The Regency Tower, 770 James Street, Syracuse, NY 13203, \$99.95.)

Hint . . .

What ROM Have You?

All CoCos come up with a message which says you are operating on version 1.0 of the operating system. How can you tell whether you have version 1.0 or 1.1 of the Basic ROM chip?

The answer is a simple one: Just type in EXEC 41175 and the version of your ROM will be printed on the screen.



Sensational Software For The TRS-80 Color Computer





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From Mark Data Products

Hostile robots await you in a series of dangerous rooms. As you fire your laser gun to destroy the robots, be sure not to touch the walls or any objects you find-they are all electrified! Don't relax for a moment...the Indestructible Menace is lurking somewhere, ready to demolish everything in his path and he cannot be destroyed. Fast-paced 1 or 2 player game with great colors and sound. Requires joystick for each player.

16K Tape, \$24.95

Cave Hunter

From Mark Data Products Vivid colors and unusual sound effects add "spice" to this action-filled arcade game for one or more players. Guide your CAVE HUNTER through the maze of cave passages, filled with scary Cave Creatures, to find gold treasures. Score points for each treasure you bring to cave entrance and for each Creature you destroy. Player's score and highest game score are displayed. Random "double point"

mode. Requires joystick. 16K Tape, \$24.95

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From Tom Mix Software

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Real-time graphics adventure game with arcade sound for the color computer. 13 floors of dungeon with monsters, treasure chests, hidden trap doors even a flying magic carpet! All in your quest to find the Scepter of Kzirgla. Whatever you do, don't get caught in the poisonous gas cloud! Extended BASIC

16K Tape, \$16.95,

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By Ron Clark from ARCsoft

Handy collection of practical, easy-to-follow techniques and shortcuts for your color computer. Each of 101 tips features a complete, pre-tested, ready to run program. Includes graphics, sound, games, text on text, number crunching.

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Best Sellers

Ghost Gobbler

From Spectral Associates

In this new and exciting version of the popular arcade game, use your joysticks to move your Ghost Gobbler through the maze, eating dots and power pills to score points. 8 bonus shapes, super sound, and 16 skill levels. Extended BASIC required; joysticks.

16K Tape, \$21.95





Invader's Revenge By Ken Kalish from Med Systems.

You are the last space invader-humans have destroyed all the others-and you're out for REVENGE! Wipe out as many as you can, avoiding their lasers and photon blasts. Multiple skill levels; 1 or 2 players; extended BASIC not required. Machine language, hi-res graphics, great sound.

16K Tape, \$19.95

Also Available: Phantom Slaver 16K Tape, \$19.95

Voyager i

From Avalon Hill

You're on board a spaceship infested with killer robots in this graphic science fiction game. You must clear the 4-level 144-location ship of robots and arm it to self-destruct. Can you do it and escape before you, too, are blown up? High-speed graphics are represented in 3-D perspective representing your eye's view; with instant switching to floor plan maps. Extended BASIC required.

16K Tape, \$19.95

6809 Assembly Language Programming

By Lance Leventhal from McGraw Hill

This comprehensive book covers 6809 assembly language programming in detail. The entire instruc-tion set is presented and fully explained. The book contains many fully debugged, practical programming examples with solutions in both object code and source code. Discussion of assembler conventions, I/O devices, and interfacing methods is also included. If you've never before programmed in assembly language, this book will teach you how. If you're an experienced programmer, you'll find this book an invaluable reference to the 6809 instruction set and programming techniques

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Tower Castle Carries Out Theme Well In Good Adventure

The fact is that a lot of work goes in to writing an Adventure program. And, it seems to us that as long as the author is going to spend a great deal of time getting everything straight from the program's standpoint, he should carry out the theme, too.

Tower Castle does this in an outstanding way. First off, let us say that it is a fine adventure with some good little tricks and the like, but that is programming and not what we are really talking about here. Or, more on this later.

The theme is set in a somewhat long introduction program that, we imagine, allows the main program to operate with only (?) 32K. By the fine use of knight-like language, the introduction sets the theme of the program and, at the same time, gives you an opportunity to view the castle you will be Adventuring in. This is certainly better than watching the little "F" blink while the program loads.

But, once the program starts it is evident the author took great pains to make this a fine excursion in a thematic Adventure. Every message in this "word"-type adventure is straight out of King Arthur's Court (or at least as we imagine King Arthur's Court to have been). The locations, the dialogue, the descriptions and the articles you are able to pick up along the way are all worked into this general theme of Knights of Old. It's an enjoyable experience.

The Adventure itself is enjoyable, too. There are enough twists and turns to keep your mental juices flowing and the experience is a good one. Death, of course, lurks in all corners. But there is a way out-usually with magic, assuming you figure out how to use it.

In addition, we liked the display which segments the screen into different areas: Things you can see, messages, directions you can go and Adventurer's input. All in all, this is one of the better Adventures to come down the pike lately.

(Moreton Bay Software, 316 Castillo Street, Santa Barbara, CA 93101, \$17.95)

(From Page 8)

Editor's Notes. . .

PRINT #-2,

comparison of the number of programs offered by the Rainbow and 80 Micro.

Incidentally, we brought this item to the attention of an editor at 80 Micro. He allowed how this item must have "slipped by." It will be corrected in the future, he promised.

This is all beside the point, and we certainly do not wish to get into an argument about number of programs, ads, pages, words or whatever that are devoted to CoCo in any magazine. Rather, we feel you, as a CoCo owner, would be interested in some facts.

First of all, the CoCo has been a true success story for Radio Shack and for personal computer owners in general. Far and away, it gives the most value for the dollar of any personal computer on the market. And, for that matter, there is some lack of understanding on the part of Mr. Green if he equates CoCo with the Atari 400, VIC-20, Timex-1000 and TI 99/4A. And, despite this, Tandy is selling the 16K CoCo for \$299, quite a bargain!

Second, Tandy does cooperate. Jon Shirley, vice president for computer merchandising, has been most open in steering his CoCo customers toward software and firmware for the Color Computer. That is true, too, for members of his staff. If you simply assess the Color Computer's position in the marketplace, it is easy to see that Mr. Shirley and his people are doing one heck of a job. After all, why do you think the the VIC, Atari, Timex and all the others are cutting price under CoCo? Did Volkswagen cut prices shortly after its "Beetle" was introduced in this country—or did other manufacturers cut their prices to meet the competition?

Third, there is a darn good outside support industry there for CoCo. One look through these pages should tell you that. Frankly, it is my impression there is more software, hardware and firmware available for the Color Computer than for the Model III/I, which Mr. Green seems to think is so well supported. Yes, many of these firms are smaller, but they have fine products—as many of you can attest.

I do read 80 Micro each month to see what it has to say. And I have had occasion to speak with Mr. Green about his magazines, mine and computers. I find him to be a nice person but, on the subject of the Color Computer, I think he is all wet and has been for quite some time. So, one of my wishes for 1983 is that I hope we'll hear no more about lack of support for CoCo from 80 Micro, either by Radio Shack or by the many, many firms which have-to my mind and in the view of others—done a good job providing you with the things you need and want for your Color Computer.

I personally think the growth and support of CoCo has been tremendous in the last year. I see it continuing and I think you, as a user who has invested good money in your system, see it that way, too.

And, frankly, since we are the only magazine which is 100 percent devoted to the 80C and its friends (TDP-100 and Dragon-32), it just might be that we're in a better position to judge than is Mr. Green, anyway.



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On the subject of the Rainbow, I do want to thank each of you for your support in this past year. We've grown from quite a few less than 1,000 in paid circulation to over 12,000 as I write this and have increased from 19 pages to somewhere in the area of 180.

Every once in a while I ask you to mention the Rainbow when you order anything from these pages. The reason is simply that our advertisers do pay the bills for our continued growth and you can help us grow by telling them that the money they are spending is paying off. That is important to us, but it is important to you, too. Thank you for every time you mention us. It allows us to keep expanding—providing more pages, more programs, more information about CoCo.

Last month I said there would be some changes this month. Well, here they are. The first should be most obvious—a new binding that gives the Rainbow a "spine" for the first time. This process is called perfect binding, and we're using it because we just got too big to be able to effectively use staples.

We have moved printers, too. The firm which now prints the Rainbow, Gibbs-Inman Co., is one of the most respected magazine publishers in the United States. You may notice the colors are brighter and the type cleaner—that is because each page of the Rainbow is now varnished and quick-dried on leaving the press. You can see the "shine" in the ink.

You might note the paper is thinner, too. But, it is more opaque than before. This is because, for the first time, we are using what is called a "coated" paper stock. No, it does not "shine." We have received a large number of requests not to use shiny paper because of light reflections that can make it difficult to see program listings you are keying in. Shiny paper may be "just the thing" for reading-type magazines like Time, but the feedback we have received from you indicates you believe such paper is a negative in a computer magazine. We would like your opinion on this.

Finally, you will see some changes in the makeup and layout coming gradually in the next few months. We want to make the Rainbow easier for you to read and find your way through. Again, let us know your opinions about these. We welcome them.

Speaking of welcomes, we hope you will welcome Joseph Kolar to the Rainbo. Joe starts a new series called Basic Training that will be for the beginner to personal computing. But, for those of you who have advanced past the beginner's stage, I think you will find Joe's contributions contain a large number of hints and tips that could improve things for you, too.

And coming up, we will have a new series on advanced programming tips. Watch for that in the next couple of issues.

We're planning to start the year with our long-awaited Adventure Issue. Frankly, the number of entries was overwhelming. We'll let you know who the winners are and print the winning Adventure for you to key in. Also in January, we plan to report the results of our reader poll. Believe it or not, more than 3,000 of you responded to the poll. Thank you. It helps us plan for the future.

In addition, there will be another contest starting next month: A simulation contest. The idea is that you must write a program with the best simulation of some kind of event—operation of a nuclear power plant, a voyage to another galaxy, flying a plane around the world, or whatever your imagination cooks up. This one should be a lot of fun, so plan to set aside some time and enter. The prizes, as usual, will be good ones.

Also coming next month, all the details on the Rainbow Connection, the electronic version of the magazine, that we mentioned last month. I think you will be excited by the prospects, so watch for the information. The Rainbow Connection should be on-line by the time you get January's issue.

Did I say that I had a wish list for 1983? Yes, I seem to remember that I did several thousand words back.

Number one on my list is a full-fledged compiler. And, I think that is a desire shared by a lot of people.

I'm also hoping to see more original-type games for CoCo. And I truly hope we see more of you bending CoCo's fantastic abilities toward educational software—especially for exceptional children and adults.

I would truly like to see someone come up with a first class version of the excellent Snapp, Inc. Basic enhancements Bob Snapp has produced for the Models II and 16. It would be a real challenge due to the differences in the machines, but a major boon. Snapp's utilities are the absolute finest I have ever seen for any microcomputer system.

Last but certainly not the least, I like to think of the CoCo world as a big family of people all linked to one another with a common bond that stretches across countries, oceans and time zones. So to each of you, from all of us, have the happiest of Holidays and the best for 1983.

You have our best wishes, I hope we have yours.

-Lonnie Falk

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Three Word Processors Give You Power, Choices

Power, that's what it is. And, of course, a great feeling of control over your CoCo. That's what you get from using a word processing program.

Let me explain. I'm what is sometimes referred to as a "word merchant." We come in a wide variety; myself, I'm the news bureau editor at a university and the greater proportion of my work day is spent writing news releases

about whatever is happening on campus.

My basic work tool is the typewriter. When I finish my rough draft, somebody else produces the finished draft which is then reproduced and mailed out. While we do have a rather sophisticated word processing system, it is in high demand and is used mainly for blending long mailing lists with form letters and such as that. The office secretary does the "word processing" on news releases, which generally run no more than three double-spaced pages, and often are only one page.

When I do have the routine form letter to send to a news media mailing list, again someone else takes my draft and disappears into the word processing room, reappearing soon with finished letters all ready for my signature. Not a bad arrangement, and when I get a stack of letter-perfect documents on my desk, awaiting my approval, I count my blessings. Quite candidly, it also makes me feel important. I hand someone a few sheets of paper full of strike-overs, editing marks, blocks of copy cut out with scissors and taped

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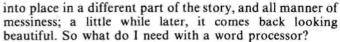
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Now, I know: Power! Yessir, it's a wonderful feeling to punch a few keys and watch spelling get corrected, lines move to new locations, and messiness just disappear. Now, I know why the support staff never seems to mind going into that little windowless room in the back of the office and sitting at a small monitor for hours on end. Probably, none of them would admit it, but I'll betcha they're hooked. They're in command and the word processor does their every bidding. They're rewarded with a beautiful finished product for their efforts, too. Responds instantly: No back talk, no coffee break—Everybody ought to have one.

You may well think I'm pulling your leg, but I've had as much fun "playing" with some word processing programs for the Color Computer as I've had with adventure games, graphics games and the like. For one thing, you feel in command instead of vastly overpowered; word processing helps you exercise some control over your computer and helps you make it perform the kinds of tricky stuff that cause your friends to sit up and take notice that CoCo is not a toy. I'm writing this rambling review with *Telewriter* and I think I'm in love. Take my games, take my ROM packs, take data files, but please don't take my *Telewriter*.

Okay, so I got a bit carried away. You know, though, back in January of this year, Rainbow reported that there were four word processing programs available for the CoCo. Today, there are more than we can keep track of—and there are still some non-believers out there who (wrongly) think CoCo isn't generally suitable for word processing. Recently, I took a good look at three of the word processing programs that are now available: Wordclone, Micro-Script and Telewriter 2.0 (the Disk version).

Rather naively, I must admit, on looking back, I agreed to compare the three, which have little in common, except that they are designed to help you produce a finished letter or document that is free of errors. All three programs are capable of that, and each has its own unique extra features.

Borrowing from the Rainbow editor Lonnie Falk's indepth review in the January, 1982, issue, I'm going to evaluate the word processing programs in five areas: display and input, editing ease, I/O capability, special features, and—adding a category of my own—documentation.

Display And Input

The screen display is very important, because this is where the work is done. Wordclone and Telewriter both use the full screen. Micro-Script uses the standard screen format that appears when you first power up your CoCo.

Wordclone uses a 50 character by 24 line display and Telewriter uses 51 characters by 24 lines. And, even though it's the lowest priced of the three, Wordclone uses real upper and lower case with true descenders—that is the "g," the "y," and other letters with "tails" do stick below the line. Telewriter has a very readable lower case, but no descenders. Micro-Script, on the other hand, uses inverse video for lower case, and if you're comfortable with that, since that's what you use in the Microsoft language that's used in CoCo's ROM, maybe that's okay. Personally, I find it very distracting.

As to input, you just start typing with *Telewriter* and keep typing until you're finished. You need pay no attention to the end of the line because, if a word won't fit, *Telewriter* just pushes the entire word down to the next line. That's really quite a feat, and even later when you insert a word or phrase, it simply pushes the rest of the copy down to make room, or pulls it back up from lower lines to fill in when you delete a word or phrase. *Wordclone* and *Micro-Script* don't offer

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With Wordclone, you must review each line as you type it and then press ENTER and wait for the line to be typed on the printer. It's plainly slow, especially if you're a speed typist. I'm not, but I found the required pause at the end of every line to be quite disruptive. But, if you are collecting your thoughts and composing as you go, it may not be a problem. If you're writing a computer program, for instance, you may not even notice the slow input.

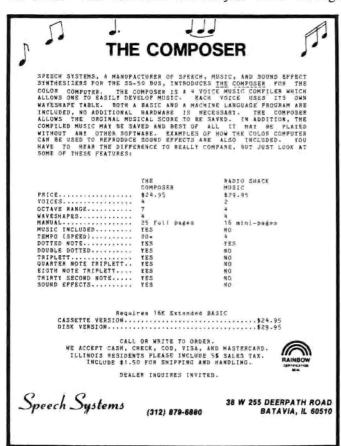
Micro-Script is a little better; you can type in two 32-character lines before you must hit ENTER, and, you don't have to feed to the printer at this point. So, input can be a lot quicker. But, if you go beyond the two lines and don't hit ENTER you may find yourself typing away and nothing appearing on the screen when you look up to check. You soon learn to keep a close eye on the screen because of this.

Editing Ease

Editing with Wordclone can be tedious. To begin with, you must first review your printout for errors and then count the fines on your printed copy. To correct an error, you must go to the editing mode and key in the line number of the line you wish to edit. That line is then displayed by itself and you are required to retype the entire line to correct an error. Then you repeat the process with any other lines that need correcting. Hopefully, since input was so slow to begin with, you won't have much correcting to do.

With Micro-Script, you don't need a hard copy for reference, and you can enter the edit mode any time you wish. Editing with Micro-Script is still a bit cumbersome because of the numerous options you must key in and you can do only one line at a time before returning to the main menu. Jumping back and forth between main menu, submenu and the text itself gets a bit old if you have multiple changes, but you can insert, delete, etc. without having to retype the entire line.

Telewriter—of course, it costs twice as much as either of the others—edits with ease. You can just "scroll" through



the entire text zipping the cursor up and down, left and right, and make massive changes with a minimum of trouble. It's really fun to do. Proofing and editing copy is where you can exercise the power I mentioned at the beginning of this review.

Basically, while *Telewriter* can run off and leave the other two programs in terms of speed in editing, all three programs have the capability to do things almost impossible with a typewriter, no matter how good the machine, or typist is.

I/O Capability

All three programs can be used with either tape or disk. Wordclone comes on tape only, though, and must be transferred to disk. While Micro-Script can be ordered in a disk version, only Telewriter's disk version has a number of extra features unique to the disk version.

With Telewriter 2.0 (disk), you have all that the tape version offers plus such things as a RENAME command to change the name of a file. Also, PRINT DIR gives you a simple way to print the directory to the printer, something the Radio Shack DOS doesn't provide. Among other features is file chaining. Say you have a document of a few dozen pages and it takes up six separate files on disk, with the "Q" embedded command on Telewriter 2.0, you can tell the print routine to read in and print the file whose name follows the Q once it's finished printing the current contents of the buffer.

Another Telewriter 2.0 feature worthy of mention is a utility program which may be used to convert Telewriter files to standard ASCII and vice versa. This is important because Telewriter does not make normal saves in ASCII. While this is an extra step, it solves a big headache which previously existed for Telewriter owners.

Obviously, disk is great to have, but there is also another facet of I/O capability—that of printer communication. This is where *Micro-Script* shines. With *Micro-Script*, you can jump back and forth between different type sizes with ease, and special instructions are provided for tailoring *Micro-Script* to whatever printer you use. You can really jazz up your printout once you get the hang of it—even with a Line Printer VII, like I have. If your printer is more versatile, well just watch you go.

All three word processing programs allow you to format your printout, but *Micro-Script* seems to be a lot easier to use.

Special Features

While you may not consider a justified right-hand margin a special feature, but rather something you'd expect of a word processor, only *Micro-Script*, of the three we are reviewing here, offers this very tidy feature. (In case you aren't familiar with "justification" as a printing term, it means having a right-hand margin that is "even," like the left-hand margin, not ragged, but all lines the same length. While this may or may not be important to you, I find that it adds a real touch of class to a document. (We understand *Telewriter-64*, which is just out, does offer this feature, but we haven't had a chance to try it.) *Micro-Script's* justification works great.

While Wordclone is a budget word processor, it does have a handy extra feature that permits you to use Wordclone as a character generator so you can have text in the graphics mode without having to go through a bunch of complicated commands.

In addition to having the capability of entering a line, which makes for nice titles, *Micro-Script* also has the ability to move line from one section of the text to another.

both Micro-Script and Telewriter allow you to search easily for some key word. Let's say you decide that every

Telewriter-64 the Color Computer Word Processor

- 3 display formats: 51/64/85 columns × 24 lines
- True lower case characters
- User-friendly full-screen editor
- Right justification
- Easy hyphenation
- Drives any printer
- Embedded format and control codes
- Runs in 16K, 32K, or 64K
- Menu-driven disk and cassette I/O
- No hardware modifications required

THE ORIGINAL

Simply stated, Telewriter is the most powerful word processor you can buy for the TRS-80 Color Computer. The original Telewriter has received rave reviews in every major Color Computer and TRS-80 magazine, as well as enthusiastic praise from thousands of satisfied owners. And rightly so.

The standard Color Computer display of 32 characters by 16 lines without lower case is simply inadequate for serious word processing. The checkerboard letters and tiny lines give you no feel for how your writing looks or reads. Telewriter gives the Color Computer a 51 column by 24 line screen display with true lower case characters. So a Telewriter screen looks like a printed page, with a good chunk of text on screen at one time. In fact, more on screen text than you'd get with Apple II, Atari, TI, Vic or TRS-80 Model III.

On top of that, the sophisticated Telewriter full-screen editor is so simple to use, it makes writing fun. With single-letter mnemonic commands, and menu-driven 1/O and formatting, Telewriter surpasses all others for user friendliness and pure power.

Telewriter's chain printing feature means that the size of your text is never limited by the amount of memory you have, and Telewriter's advanced cassette handler gives you a powerful word processor without the major additional cost of a disk.

...one of the best programs for the Color Computer I have seen...

- Color Computer News, Jan. 1982

TELEWRITER-64

But now we've added more power to Telewriter. Not just bells and whistles, but major features that give you total control over your writing. We call this new supercharged version Telewriter-64. For two reasons.

64K COMPATIBLE

Telewriter-64 runs fully in any Color Computer — 16K, 32K, or 64K, with or without Extended Basic, with disk or cassette or both. It automatically configures itself to take optimum advantage of all available memory. That means that when you upgrade your memory, the Telewriter-64 text buffer grows accordingly. In a 64K cassette based system, for example, you get about 40K of memory to store text. So you don't need disk or FLEX to put all your 64K to work immediately.

64 COLUMNS (AND 85!)

Besides the original 51 column screen, Telewriter-64 now gives you 2 additional high-density displays: 64×24 and $85 \times 24!!$ Both high density modes provide all the standard Telewriter editing capabilities, and you can switch instantly to any of the 3 formats with a single control key command.

The 51×24 display is clear and crisp on the screen. The two high density modes are more crowded and less easily readable, but they are perfect for showing you the exact layout of your printed page, all on the screen at one time. Compare this with cumbersome "windows" that show you only fragments at a time and don't even allow editing.

RIGHT JUSTIFICATION & HYPHENATION

One outstanding advantage of the full-width screen display is that you can now set the screen width to match the width of your printed page, so that "what you see is what you get." This makes exact alignment of columns possible and it makes hyphenation simple.

Since short lines are the reason for the large spaces often found in standard right justified text, and since hyphenation is the most effective way to eliminate short lines, Telewriter-64 can now promise you some of the best looking right justification you can get on the Color Computer.

FEATURES & SPECIFICATIONS:

Printing and formatting: Drives any printer (LPVII/VIII, DMP-100/200, Epson, Okidata, Centronics, NEC, C. Itoh, Smith-Corona, Terminer, (etc.)

Embedded control codes give full dynamic access to intelligent printer features like: underlining, subscript, superscript, variable font and type size, dot-graphics, etc.

Dynamic (embedded) format controls for: top, bottom, and left margins; line length, lines per page, line spacing, new page, change page numbering, conditional new page, enable/disable justification.

Menu-driven control of these parameters, as well as: pause at page bottom, page numbering, baud rate (so you can run your printer at top speed), and Epson font. "Typewriter" feature sends typed lines directly to your printer, and Direct mode sends control codes right from the keyboard. Special Epson driver simplifies use with MX-80.

Supports single and multi-line headers and automatic centering. Print or save all or any section of the text buffer. Chain print any number of files from cassette or disk. File and I/O Features: ASCII format files — create and edit BASIC, Assembly, Pascal, and C programs, Smart Terminal files (for uploading or downloading), even text files from other word processors. Compatible with spelling checkers (like Spell 'n Fix).

Cassette verify command for sure saves. Cassette autoretry means you type a load command only once no matter where you are in the tape.

Read in, save, partial save, and append files with disk and/or cassette. For disk: print directory with free space to screen or printer, kill and rename files, set default drive. Easily customized to the number of drives in the system.

Editing features: Fast, full-screen editor with wordwrap, block copy, block move, block delete, line delete, global search and replace (or delete), wild card search, fast auto-repeat cursor, fast scrolling, cursor up, down, right, left, begin line, end line, top of text, bottom of text; page forward, page backward, align text, tabs, choice of buff or green background, complete error protection, line counter, word counter, space left, current file name, default drive in effect, set line length on screen.

Insert or delete text anywhere on the screen without changing "modes." This fast "free-form" editor provides maximum ease of use. Everything you do appears immediately on the screen in front of you. Commands require only a single key or a single key plus CLEAR.

...truly a state of the art word processor...
outstanding in every respect.

— The RAINBOW, Jan. 1982

PROFESSIONAL WORD PROCESSING

You can no longer afford to be without the power and efficiency word processing brings to everything you write. The TRS-80 Color Computer is the lowest priced micro with the capability for serious word processing. And only Telewriter-64 fully unleashes that capability.

Telewriter-64 costs \$49.95 on cassette, \$59.95 on disk, and comes complete with over 70 pages of well-written documentation. (The step-by-step tutorial will have your writing with Telewriter-64 in a matter of minutes.)

To order, send check or money order to:

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Or check your local software store. If you have questions, or would like to order by Visa or Mastercard, call us at (619) 755-1258 (weekdays, 8AM-4PM PST). Dealer inquiries invited.

(Add \$2 for shipping, Californians add 6% state tax. Allow 2 weeks for personal checks. Send self-addressed stamped envelope for Telewriter reviews from CCN, RAINBOW, 80-Micro, 80-U.S. Telewriter owners: send SASE or call for information on upgrading to Telewriter-64. Telewriter-compatible spelling checker (Spell 'n Fix) and Smart Terminal program (Colorcom/E) also available. Call or write for more information.)

Apple II is a trademark of Apple Computer, Inc.; Atari is a trademark of Atari, Inc.; TRS-80 is a trademark of Tandy Corp; MX-80 is a trademark of Epson America, Inc. time you used the word "university," you now want it capitalized. Well, the search command finds each instance of "university" quickly and, on signal then immediately searches for the next occurrence. That's an impressive feature to use to show off your computer to your buddies.

Frankly, Telewriter has so many features, I am quite sure I haven't even discovered many of them. Automatic page numbering is one. The super formatting menu is another. Best of all, for me anyway, is the documentation. That's our last category of review.

Documentation

Wordclone's documentation is contained on a single 8½ X 11 sheet of paper folded in half to make four pages. Micro-Script' comes to 10 pages of single-spaced information—quite a lot by most standards. but Telewriter 2.0 has 81 pages and is crammed with all the details anybody is likely to ever need. That's not excessively long when you consider that Telewriter has some 71 separate commands.

I prefer to have a manual and, while it took me a long time to wade through the *Telewriter* tutorial, I felt reassured to have all the details down on paper. I suppose if you're the type who can't wait to get started, *Wordclone* may be your answer; two minutes and you've absorbed it all. If you like line-by-line instructions, *Micro-Script* has what you need. But if you want every comment and "what if" explanation imaginable, then *Telewriter* is the one for you.

Summary

Which one is the right one? Obviously, that depends on your individual needs. (I always hate it when I read that "well it depends" kind of statement, but it's unavoidable.) Clearly, *Telewriter* is the streamlined program, but it can't

justify the right-hand margin while Micro-Script can. Similarly, only Wordclone gives you real lower case descenders. (A caveat here. While Wordclone and some other programs on the market do provide "real" lower case on the screen, that doesn't mean your printer will print it that way; it just appears that way on the screen. It takes a hardware modification to change the way a printer's typeface looks.) And, lastly, Telewriter is a very sophisticated program—thus it requires a sophisticated user; you can't perform all the functions unless you've studied the manual.

It should be noted, too, that both Wordclone and Micro-Script are in BASIC, while Telewriter is in machine language. This certainly makes the former easier to modify—but it also makes the latter faster. If you think you'll be making modifications to the program you'll buy, having that program in BASIC is a real plus.

A final piece of advice. Even if you have enough spare change to go out and get all three programs, don't. Get one and stick with it. The key to getting results is to standardize and stick with a format you're familiar with. This reveiwer just about went bananas as he switched from one program to another—the commands are quite different, and with the same command that cleaned up overflow lines on one program I managed to clean the entire program right out of memory when I mistakenly tried it with another.

But, do try word processing if you've yet to try it. You'll find yourself writing to old friends just to be able to use your newest toy.

(Wordcione, IMB, Illustrated Memory Banks, P.O. Box 289, Williamstown, MA 01267-0289, \$18.95.

Micro-Script, Micro-80 Inc., 2665 N. Busby Road, Oak Harbor, WA 98277, \$24.05 (tape or disk)

Telewriter 2.0, Cognitec, 704 Nob Avenue, Del Mar, CA 92014, \$49.95 (tape) or \$59.95 (disk).)

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Gangbusters is "Gangbusters" In This Reviewer's Opinion

If you've ever dreamed of living a life of crime, Gangbusters is an excellent way to get started, keeping you both safe and innocent!

First, the documentation gives you a complete glossary of the Mafia language, which I had no earthly idea about. Secondly, after loading the tape (Pricky-Pear used Sugar Software's Auto Run program), it says it is 1920 and the prohibition era has begun. Two to six players can play. It asks the names of the players and, then, gets started. (There are so many bells and whistles in this, I had to write most of them down.)

You start out with \$6000, and you can get more by buying unions, bootleg operations, limos and the sort. Later on it asks you the percentage rate on your operations. There is one part I especially like—"Playing the Ponies," or in other words, betting on horses. You pick the horse you want, place your bet and they're off! I wish there was a graphic simulation of this, but you can't have everything.

Another thing I'll mention is that the Juiceman can get you into trouble, but that's all I'll say. I was sent a letter about a week after the program arrived saying that Gangbusters would not work on a 16K machine because of bugs. Fortunately, I had a 32K machine, and it loaded okay. I enjoyed Gangbusters very much and think you also will be pleased.

(Prickly-Pear Software, 9822 E. Stella Road, Tucson, AZ 85730, \$19.95 tape, \$24.95 disk.)

-Andy Peters

Submitting Material To the Rainbow

Contributions to *the RAINBOW* are welcome from everyone. We like to run a variety of programs which will be useful/helpful/fun for other CoCo owners.

Program submissions must be on tape or disk and it is best to make several saves, at least one of them in ASCII format. We're sorry, but we do not have time to key in programs. All programs should be supported by some editorial commentary, explaining how the program works. We're much more interested in how your submission works and runs than how you developed it. Programs should be learning experiences.

We do pay for submissions, based on a number of criteria. Those wishing remuneration should so state when making submissions

For the benefit of those who wish more detailed information on making submissions, please send a SASE to: Submissions Editor, the RAINBOW, P.O. Box 209, Prospect, KY 40059. We will send you some more comprehensive guidelines.

Please do not submit programs or articles currently submitted to another publication.

Hint.

You can double the speed at which CoCo operates with a simple POKE statement, entered either directly from the keyboard or within a program. The statement is POKE 65495,0. This will speed up your CPU. You can return the computer to its normal speed again by POKE 65494,0.

Note that you cannot perform any Input/Output operations (such as saving the program to cassette) when the speedup is in effect.

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"Once killed, twice warned," has become my motto. Recently, after having been killed maybe two dozen times in Dragonquest!, my latest CoCo Adventure, it was with some amusement that I realized that the source of my bemusement was my total inability to reach the "Land of the Dead." That's right, the only way to reach the Land of the Dead is to stay alive; paradoxical, to say the most.

Dragonquest! offers some new dimensions to my computer adventure experience. Among the verbs it recognizes are ROW and FLY, for instance. In this computer challenge, DRINK is neither a verb nor a noun, but you may find yourself in the "drink."

Dragonquest! creater Charles Forsythe is full of tricks. Few things in this adventure are what they first seem to be, or to be used as one might first suppose. My best advice is "think again" before doing anything that seems logical. But, then what do I know? After fairly well conquering a sizable portion of the realm, I found myself aimlessly wandering in a dark forest with apparently no hope of getting to a clearing.

I just knew that the Land of the Dead mentioned in the

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documentation had to be somewhere inside that dark forest, but, try as I might, I could not find it. So, I cheated. I printed the entire listing and went over it with a red marking pen. But cheaters never win do they? I did find out that there was a big portion of the kingdom that I had not even begun to explore—and, even with the listing at my side, I still couldn't find it.

Having already demonstrated that I have no scruples, I elected to try another bit of resourcefulness. I called the phone number supplied with the instructions and got a character who spoke in riddles. Called himself "Captain 80," if I heard him right. Must be a cousin of "Commander 80." Claimed he wasn't Charles Forsythe, but that he could answer any question I might have.

So, I asked him, "If a tree frog falls in the forest, is there a sound?" Well, he mumbled something about "one hand clapping" and told me I had two more wishes. So, I wished that he would tell me how to find the Land of the Dead. He allowed as how that wouldn't be very sporting, but gave me a hint or two that sent me off to adventure land again without even remembering to use my third wish. I still have his phone number though.

Dragonquest! doesn't have a whole lot of documentation. About all you know to start with is that the dragon "Smaegor," purportedly the Monarch of Dragonfolk, has kidnapped the Princess of the Realm and you have to find her and rescue her. Presumably, some sort of quid pro quo will follow your daring rescue.

Well, folks, cheaters do sometimes win. Armed with a listing printout and some long distance information, I finally succeeded in rescuing that little gal from Samegor's evil clutches and got her in my own. The kid didn't know when she was well off. Before it was over, I had myself half of the kingdom. Forsooth, Forsythe, you've been foiled again!

Those who are familiar with the adventure genre should enjoy *Dragonquest!* The rest of you may have some heaping helpings of frustration. Here's a hint: Adventure game authors have absolutely no sense of syntax, and they almost always speak in two-word sentences. Don't use any two-dollar words, just speakum like this: "Eat food"; "Kill shovel"; "Go potty." You get the picture. Pretend you're in a foreign country and you left your phrase book at home.

Good fun. Send money. Buy game.

(The Programmer's Guild Inc., P.O. Box 66, Peterborough, NH 03458. Tape: \$15.95, Disk: \$21.95.) — Jim Reed

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For These Three Friends The Outcome's a Bit Dicey

By Bob Albrecht and George Firedrake Rainbow Contributing Editors

We want to introduce three friends. They will assist us now and in future issues. Each is a specialist. We want you to meet

- · Annalee Analyticus,
- · Hieronymus Heuristicus, and
- · Theodore Theoreticus.

Who are they? It is difficult for us to describe them. Instead, you will get to know them by what they do on our pages. Eventually you will know them, perhaps better than we.







Last time we said, "If you roll two six-sided dice and add the spots (or numbers), you will get a number from 2 to 12." Then we asked, "How many ways to get 2, or 3, or 4, or any possible number, up to 12?"



Annalee clarifies, "Think of rolling two dice, one green and one red. The gree die can come up 1, 2, 3, 4, 5, or 6. Independently, the red die can come up 1, 2, 3, 4, 5, or 6." She pauses, then continues, "Of course, these are very independent dice—green knows not what red does, nor does red know the predilections of green."



Annalee glowers at Kilroy, then pursues her thought, "For each possible role of green, there are six possible rolls of red. So, I declare, there are 6 times 6, or 36 ways for these two dice to come up."

Perhaps because we looked perplexed, she wrote down the 36 ways on a Taverna Athena napkin. Later, we were able to read some of her inscriptions on the ale-stained napkin, and reproduce them here for you.

GREEN	RED	SUM (GREEN + RED)	
1	2	3	
i	3	4	
This part	is illegible.	3	
2	5	7	
2 2	5	7 8	
2 2 3	5 6	7 8	

The rest of the napkin is illegible, stained and smeared.

Annalee's napkin gave us the idea for the following program. It "rolls" all 36 possible combinations for two dice and counts the number of times each sum, 2 through 12, occurred.

Annalee shows the way Listing GMA 4-1

> 100 REM ** ANNALEE SHOWS THE WAY 110 DIM COUNT(12)

300 REM ** SET COUNTS TO ZERO

31Ø FOR K=2 TO 12 32Ø : COUNT(K) = Ø

33Ø NEXT K

400 REM ** COUNT OUTCOMES

410 FOR GD=1 TO 6

42Ø : FOR RD=1 TO 6

430 : SUM = GD + RD

440 : COUNT (SUM) = COUNT (SUM)

+ 1

45Ø : NEXT RD

46Ø NEXT GD

600 REM ** TELL WHAT HAPPENED

61Ø CLS

620 PRINT "OUTCOME", "NUMBER OF

WAYS"

63Ø FOR K=2 TO 12

640 : PRINT K, COUNT (K)

65Ø NEXT K

999 END

As usual, our program is in *blocks*. Each block begins with a REM statement. We usually begin a block with a line number that is a multiple of 100. The above program has blocks 100, 300, 400, and 600. We try to make our pgorams

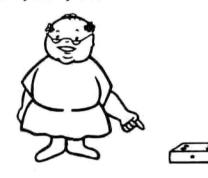
easy for people to read and understand. Let us know if this helps you.

YOUR TURN. Write block 500 to compute the *probability* of each outcome. Then modify block 600 so the CoCo prints as follows:

OUTCOME	WAYS	PROBABILITY
2	1	.028
3	2	.056
4	3	.083 FanTABulous!
5	4	الرس مراب المال
6	5	.139
¥.		$(\boldsymbol{\rho}\boldsymbol{\rho})$
and so on, up	to 12.	

Yes, you probably noticed? We want the probability rounded to three decimal places.

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Box 1353 R.R. 1 Yarmouth, Nova Scotia B5A 4A5 (902) 649-2965 "That's very nice, Annalee," says Hieronymus, "and I see how that would be true for perfect dice. However, if the dice are not perfectly cubical, or perhaps worn a little, the probabilities might be slightly different. And, we all know about loaded dice! As for me, I like to find out from experience, by actually rolling dice, just how they behave."

Hummmm . . . this got us wondering about how well the computer simulated rolling 2D6. So we wrote a program we think Hieronymus will like.

Listing GMA 4-2

```
100 REM ** HIERONYMUS ROLLS 2D6
11Ø DIM COUNT(12)
199 :
200 REM ** TALK TO A PERSON
210 CLS
22Ø INPUT "HOW MANY ROLLS"; SAMP
LESIZE
299 :
300 REM ** SET COUNTS TO ZERO
31Ø FOR K=2 TO 12
32\emptyset : COUNT(K) = \emptyset
33Ø NEXT K
399 :
400 REM ** ROLLDICE, COUNT OUTCO
MES
410 FOR ROLL=1 TO SAMPLESIZE
420 : GOSUB 910
43Ø : COUNT(OUTCOME) = COUNT(OUT
COME) + 1
44Ø NEXT ROLL
499 :
600 REM ** TELL WHAT HAPPENED
61Ø PRINT
62Ø PRINT "OUTCOME". "FREQUENCY"
63Ø FOR K=2 TO 12
64Ø : PRINT K, COUNT(K)
65Ø NEXT K
699 :
700 REM ** TELL HOW TO DO AGAIN
71Ø PRINT
720 PRINT "FOR NEW SAMPLE, PRESS
 ANY KEY"
73Ø IF INKEY$ = "" THEN 73Ø ELSE
 210
799 :
900 REM ** DICE SUBROUTINE
910 \text{ GD} = \text{RND}(6)
920 \text{ RD} = \text{RND}(6)
93Ø OUTCOME = GD + RD
94Ø RETURN
999 END
```

This time we used a subroutine to "roll" the dice. This allows us to easily change the program to roll different dice. We suggest you save this program on cassette or disk. We call it GMA 4-2 because it is the second program in part four of Game Master's Apprentice.

Theodore suggests, "For a large SAMPLESIZE, this program should produce results compatible with Annalee's program. For example, let's try runs of 360 rolls and see if we get numbers for each OUTCOME about ten times the numbers from Annalee's program."

So we did. Here are results from three runs. For comparison, we also show the numbers obtained by multiplying Annalee's numbers by ten.

OUTCOME	1st RUN	2nd RUN	3rd RUN	ANNALEE"
2	11	7	10	10
3	23	18	19	20
4	29	31	32	30
5	43	46	41	40
6	51	45	43	50
7	56	63	60	60
8	46	57	48	50
9	41	36	39	40
10	32	29	34	30
11	20	16	26	20
12	8	12	8	10

Your Turn Write block 500 to comute the proportion of each OUTCOME during a run. Modify block 600 so the information is printed as shown below for our 1st RUN above.

OUTCOME	FREQU	JENCY	PROPORTIO	١
2	11		.031	
3	23		.064	
4	29		.081	
4 5	43	4.	.119	
6	51		.142	
7	56		.156	
8	46		.128	
9 .	41		.114	
10	32		.089	
11	20		.056	
12	8		.022	
FOR A NEW	SAMPI	E PRE	S ANY KEV	

Theodore suggests, "Compare these PROPORTIONS with the PROBABILITIES in Annalee's method (you did do that, didn't you?). Try a large SAMPLESIZE, 1000 or 2000 or even 10000 (that will take awhile!)."



How might unfair dice affect the PROBABILITIES or PROPORTIONS? Try an unfair green die.

- GD + RND(7): IF GD + 7 THEN GD + 5
- GD + RND(8): IF GD is greater than 6 THAN GD + 4
- And others suggested by the above!







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In many role playing games, you create a Playing Character (PC) by rolling 3D6 for each of several characteristics. in "GameMaster's Apprentice," we will use characteristics compatible with the RuneQuest and Worlds of Wonder game systems. They are listed below.

Strength (STR)
Constitution (CON)
Size (SIZ)
Intelligence (INT)
Power (POW)
Dexterity (DEX)
Charisma (CHA)

Dungeons & Dragons
uses similar characteristics.

Rolling 3D6 gives a number from 3 to 18 for each characteristic. Expect to roll 9, 10, 11 or 12 about half the time. These are "average" or "near average" rolls.

Annallee claims there are 6*6*6, or 216 ways for the three dice to come up. How many ways to get 3? How many ways to get 4? How many ways to get 5? And so on.

YOUR TURN Write a program to compute the number of ways each outcome (3 to 18) can occur when rolling 3D6. Use the program called ANNALEE SHOWS THE WAY as your guide. While you are at it, you might as well include block 500 to compute the PROBABILITY for each OUTCOME.

STILL YOUR TURN Modify the program called HIERONYMUS ROLLS 2D6 to roll 3D6 and count outcomes. We tink you will have to change only lines 100, 110, 310, 630, and the DICE SUBROUTINE. Of course, you may want to also write block 500 com compute the PROPORTION for each OUTCOME. Hieronymus encourages you to do so.

ROLL A CHARACTER Relax, no mugging is intended. We suggest you write a program to roll 3D6 for each of the seven charactristics STR, CON, SIZ, INT, POW, DEX, and CHA. Tell the CoCo to display the results as shown below.

STR	17	Barostan is big and strong,
CON	17	but not too bright. He is good
SIZ	13	to have on your side in a light,
INT	8	if someone will tell him who to
POW	7	hit. He acts first, then thinks
DEX CHA	15	later, if at all.

STR	13	Joleen is a clown, mime, acrobat,
CON	11	dancer, or whatever else might
SIZ	7	enterain an audience. She wants
INT	13	to travel with a troupe of
POW	8	wandering entertainers, and perform
DEX	17	at fairs and festivals. She will
CHA	13	charm you,

Barostan and Joleen are young and inexperienced. Both are 16 years old. They live in a village near the town of Triford in Wundervale.

Next time, we will show you our 3D6 programs in the manners suggested by Annalee and Hieronymus. We will also show our program to ROLL A CHARACTER.

What do you want? If it fits into the general idea of "GameMaster's Apprentice," we might do it. Send your requests to George & Bob, P.O. Box 310, Menlo Park, CA 94025. If you want a reply, enclose a self-addressed, stamped envelope.





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ESCAPE

A 3-D GRAPHICS ADVENTURE WITH SOUND (Machine Language for Fast Action)

This is NOT the usual "find the treasure" adventure. In ESCAPE, you are trapped on the top floor of a skyscraper and the only way out is by using a very unusual elevator. You must give the elevator the correct code or else the ride down is a real killer. The maze-like halls seem to come to life due to the fantastic 3-D graphics. Search the halls for rooms which contain clues to the correct code. Clues must be deciphered to learn the elevator's secret code. Game times depends on the skill of the player, but it is typically 8-10 hours. ESCAPE is suitable for group play. A mentally stimulating experience.

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RECIPE FILE

A CASSETTE BASED STORAGE AND RETRIEVAL SYSTEM

This program permits storage of your favorite recipes for retrieval by your computer. Once a recipe has been recalled, then the computer can adjust the ingredient measure for serving the desired number of persons. Each recipe can contain special comments on preparation as well as the full instructions for using the recipe. Included is a line oriented text editor for creating and editing the variable length files. Completely menu driven and very user friendly. Easily modified by the user for use in keeping track of record. coin or stamp collections or whatever your interest. Screen or printer output.

16K Ext. BASIC

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SPECIAL: A collection of 30 recipies covering main meals to snacks. Only \$3.95 with program.

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SQUIRE

SQUIRE is a challenging game of asset management. The player must manage a country estate and contend with crop failure, investment losses, taxes and other such headaches. The object of the game is to increase the estate's value while providing for the peasant workers. The starting assets are computer selected so that each game offers different challenges. Great experience for the kids or aspiring executives.

16K Ext. BASIC

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This menu driven program package is designed for creating and maintaining a data file on cassette of 30 household expense categories for a 12-month period. It also keeps cumulative totals and a separate total of tax deductable expenses. A comparative analysis program provides a graphic presentation of relative expenses between any two months during the year. The user can change categories by modifying program code. Screen or printer output.

16K Ext. BASIC

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FLIPPER

A fun and challenging version of the Othello" type board games. This version includes options for play solely by the computer, one player against the computer, or two players against each other. The computer can play on four skill levels. Very colorful with plenty of sound. Fun for kids and challenging for adults. Great for parties.

16K Ext. BASIC

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★ Disassembler-Assembler (DISASM) ★

Using English mnemonics and decimal locations, DISASM is a quick way to learn to assemble machine language programs. Analyze the CC ROMS plus ML programs with the disassembler. Cassette \$19.95

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Organize text into remark statements with DYWORD's machine language subroutine, which quickly prints to screen or an external printer. Use the LIST command to quickly review the text. Only the start and ending statement numbers need be entered for execution. No more arrays, CHR\$(N), PRINT#-2, or other awkward commands are required. Enter exactly what you want printed in the statements, including printer control commands. Allows printing form letters, purchase orders, personal and business letters. No extra memory is required and the Basic Control Program is easily modified. Cassette \$24.95

16K Computer Required Programs Do Not Require Ext. Basic

Game Cartridge Modifications

★ Dynamic Interrupt Modification (DIM) ★

This modification includes adding a push button which, when engaged, causes an interrupt. The computer then runs a machine language subroutine after which it returns to its previous task. Examples include printing the characters on the screen to an external printer and saving the screen to memory. The Auto Start feature is disabled and the game is run by EXEC 49152. Example programs are included. Send Cart & \$15.95.

★ EPROM Socket Addition (ESA) ★

This modification involves adding a socket and switch to select the EPROM or game. A 4K or less Basic or machine language program can be placed in the EPROM. Send Cart and \$18.95.

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Hardware Review ...

A Look At The New Radio Shack Graphic Printer

Here at Prickly-Pear Softwear we have a new printer on the staff—the Radio Shack model CGP-115 Color Graphics Printer (stock number 26-1192). It's a tiny little fellow, measuring about eight by eight inches, standing less than three inches high, and weighing in at less than two pounds. The capabilities are not small at all, however, and we have been very happy with it overall.

It isn't exactly a printer in the truest sense of the word, because it actually draws everything with teensy ball point pens (about an inch long). It really is a plotter, and if you get tired of letters and numbers it will also draw circles, boxes, or most any other shape you can program. Using it to plot like this is very much like plotting on one of the high resolution PMODE screens with the DRAW statement. By the way, there are four of these teensy little pens, so if you tire of black you can select red, blue, or green. With considerable effort, you could draw landscapes right on the printer in four colors!

Much of the power of the little printer/plotter stems from the fact that it has its own language built right in, with a whole bunch of commands you can use to draw or print in any of the four colors, draw letters and numbers in 65 sizes, and print in any direction on the paper. It will draw letters as small as 80 across a four inch page, or as large as one across the same four inches.

Remember now, this is a printer/plotter, with emphasis on the plotter. Naturally it will do listings of programs and other such mundane chores, but if that's all you need a printer for, you would probably be better off with an inexpensive dot-matrix line printer. For ordinary printing and listing, the disadvantages of the CGP-115 are several. First, it only prints four inches wide, so word processing is out unless you want to mail your mother a letter that looks like a scroll. Second, it is slow—very slow, and the rated speed is overly optimistic, particularly with a serial interface. Also, the rating doesn't take into account linefeeds, which this printer does very slowly. Third, the pens have a fairly short life, and you must remember to remove and cap them when you aren't using the printer, or they will dry out.

On the plus side, remember that the printer/plotter was never intended to replace a line printer. The quality of the printing is very good, and also copies nicely, and the printer must be the quietest I have ever experienced. That was a big plus indeed to me, as I tend to go for a walk when the line printer is busy. For programmers like me, who keep using a line number until it is worn out, the buffer in this printer will easily handle even a full 255 byte program line.

All in all, the little guy does a great job with all of its graphic functions, and has resolution down to .2 millimeters. (That's less than 1/100 of an inch). It will draw any shape you can program, in color, and will even do a good job of listings and other line prnter tasks if you are in no big hurry. If your needs include word processing or address labels (the printer takes it own special roll of paper) then forget it, but otherwise, it's a good all-purpose little machine, and the least expensive printer (at list) that I've seen. Naturally, you could just get several printers for different uses.

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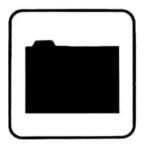
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Our plotter seems well built, and while I'm no printer engineer, it has given absolutely no trouble in extensive use. For those of you with more than one computer in your collection, this one has both RS-232 serial and Centronics parallel ports, and will thus interface with almost any

Below is a little program for use with the CGP-115. It draws solid and open circles, boxes of various sizes, and some fancy bold face lettering. Just RUN the program and follow the menu to select the function you want. It will be self-explanatory.

(Available at all Radio Shack dealers and stores)

-Bill Nolan

1Ø PRINT#-2, CHR\$(18):FOR X=1 TO 2000:NEXT:PRINT#-2,"M0,-175" 20 CLS:PRINT@66, "1. BOXES":PRINT @130."2. CIRCLES":PRINT@194, "3. SOLID CIRCLES":PRINT@258,"4. BOL DFACE": K\$=INKEY\$ 3Ø K\$=INKEY\$:K=VAL(K\$):IF K<1 OR K>4 THEN 3Ø ELSE SOUND 15Ø,1:ON K GOTO 1000,2000,3000,4000 1000 PRINT#-2, "H" 1010 CLS: INPUT"HOW WIDE A BOX"; X 1020 PRINT: INPUT"HOW LONG"; Y: Y=Y *-1 1030 PRINT: INPUT"WHAT TYPE LINE" ;T 1040 PRINT#-2, "L"; T 1050 PRINT#-2, "D"; X", 0, "X", "Y", 0 , "Y",Ø,Ø" 1060 PRINT#-2, "MØ, "Y-250

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```
1070 PRINT#-2,"I"
1Ø75 PRINT#-2, "L"; Ø
1Ø8Ø GOTO 2Ø
2000 PRINT#-2,"I"
2010 INPUT"WHAT RADIUS";R
2020 FOR Z=-R TO R
2030 X=Z+R
2040 Y=SQR (R*R-Z*Z)
2050 PRINT#-2, "D"; X", "; Y
2060 NEXT
2070 PRINT#-2, "H":FOR Z=-R TO R:
X=Z+R
2080 Y=SQR (R*R-Z*Z)
2090 PRINT#-2, "D"; X", "; (Y-Y*2)
2100 NEXT: PRINT#-2, "H"
211Ø PRINT#-2, "MØ, "R-25Ø: PRINT#-
2,"I":GOTO2Ø
3000 INPUT"WHAT RADIUS"; R
3Ø3Ø FOR Z=-R TO R
3Ø4Ø X=Z+R
3Ø5Ø Y=SQR(R*R-Z*Z)
3060 PRINT#-2,"D";X",";Y
3070 PRINT#-2, "D"; X", "; (Y-Y+2)
3080 NEXT:PRINT#-2,"H"
3085 PRINT#-2,"MØ,"R-250:PRINT#-
2, "I"
3090 GOTO 20
4000 INPUT"LETTER SIZE";S
4005 INPUT"HOW BOLD (1-6)";XX
4006 IF XX>6 OR XX<1 THEN 4005
4Ø1Ø PRINT#-2, "S";S
4020 LINE INPUT"PRINT WHAT? ";P$
4Ø3Ø FOR X=Ø TO XX:PRINT#-2,"M";
X; ", Ø"
4050 PRINT#-2, "P"; P$: PRINT#-2, "H
4Ø52 NEXT
4Ø55 PRINT#-2, "MØ, -2ØØ":PRINT#-2
. "I"
```

DON'T GET CAUGHT BY A PRICE INCREASE

4060 GOTO 20

The annual subscription rate for the Rainbow will increase on January 1, 1983. You can still renew your subscription—and avoid the added cost-by sending in a renewal in advance.

Any one-year renewal (or new subscription) postmarked by or before December 31, 1982, can take advantage of present rates. After that, the new rate will be in effect.

U.S. subscriptions will increase from \$16 to \$22, Canadian and Mexican rates increase \$7. Other foreign rates will go up proportionately.

Colorshow Just So-So, CoCo

Speed kills, they say; and along that same line of contention, mediocrity disappoints.

It's not that Colorshow is really devoid of merit, but, to me, my head full of the anticipation of dramatic graphics, building and swirling across my monitor screen in time to the strains of a favorite opus, it was ..., well, a bit of a letdown. Honestly.

Colorshow might work well with Rock & Roll, but I don't know that. All I had available at the time I ran the program was a Hayden cello concerto.

There were no swirls, or stabs of light to fill the screen, but, on a predominately black background, there appeared a fairly-repetitious series of rectangles and crosseddiagonals, developing and dissolving in a way that, while keyed in some fashion to the impulses from my sound tape, were not really that much in time with the music.

Now, even though Colorshow left me less than thrilled, it does have some features of interest that I should point out. It will respond to any sound coming from the computer cassette cable, allowing you to plug into any radio or recorder. The instructions warn you, however, to stay with a low-level source, such as an earphone jack. The program also has variable response sensitivity, allowing you to adapt to different sound sources.

(Ilume Design, 4653 Jeanne Mance Street, Montreal, Quebec, Canada H2V 475, \$14.95)

-Courtney Noe

Corrections

There may have been some misunderstanding on use of the SAILDAT program listing from the SAILOR program. Here is a rundown on the correct way to use it:

- 1. Load SAILDAT but do not RUN it.
- 2. Place a blank tape in your recorder. Press PLAY and RECORD.
 - 3. RUN SAILDAT. This makes a data tape.
 - 4. Load SAILOR but do not run it yet.
- 5. Put the data tape you just made with the SAILDAT program into the recorder. Press PLAY.
- 6. Run SAILOR. It will load the data from the tape you just made.

Once you have made the data tape, you do not need to make another. Just use the data tape when you run the SAILOR program,

This procedure should also be employed with the Rainbow On Tape version of the program.

In the 64K upgrade for the "D" revision Board, the instruction which says to jumper pin 9 of U10 to pin 35 of U10 was incorrect. While it will not damage your system, you should, instead, jumper pin 9 of the RAMs to pin 35 of

In the November issue, the Shades of PMODE 1 and 3 contains two errors.

In the title, the number 2 should have been a 3.

In line 20 of the first short program, the letter L should have been the number 1.

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Railrunner Flies While Frog-Man Hops

Of these two programs, Railrunner and Frog-Man, Railrunner is definitely the handsome prince, while Frog-Man is, well, just a frog.

In all fairness, I must point out that Frog-Man, which costs considerably less than the Computerware offering, was written by a young novice to the commercial software field, and does much more to point out his future potential than to provide us with a quality game in its current form. The areas of the game I feel most critical of are its player control (my frog got squashed almost every time in the first lane of traffic) and graphics (a bit primitive). The sound is good, however, and I feel that with a couple of leaps in the program, this one could hop on up. Computer Island ought to be congratulated for seeking out and encouraging such young talent.

Railrunner, on the other hand, and in my opinion, has arrived at the level necessary to be competitive in an evergrowing field of quality, arcade-game software. It has excellent graphics, good color and sound, and nicelyprogrammed action.

The action field consists of a series of horizontal tracks. endlessly patrolled by train engines and handcars, which the Railrunner must decend until he reaches, and zaps, Herman Hobo at the bottom of the field. You play against time, while trying to dodge the trains and handcars, and are given a ticking clock at the top of the screen, along with a score display. The four directional-arrows control your moves. Railrunner requires 16K to play, and is a machine-language

(RailrunnerComputerware, Box 668, Encinitas, CA 92024,\$21.95 on tape, \$26.95 disk.

Frog-Man: Computer Island, 227 Hampton Green, Staten Island, NY 10312, \$11.95 on tape.)

-Courtney Noe

Hint . . .

Finding ML Addresses

You can find the address of a machine language program by PEEKing several addresses in memory. Those addresses

To find the start address, use the command PEEK (487)*256 + PEEK(488)

To find the end address, use the command PEEK(126)*256 + PEEK(127)-1

To fine the execute address, use PEEK (157)*256 + PEEK(158)

With all of these commands, you must ask CoCo to PRINT the addresses as well as work out the formula. You can use the commands either in a program or in direct mode from the keyboard.

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Laser Tank Duel A Blast for Two

"Enemy tank sighted along corridor four. Mayday! Mayday!"

As the message of sudden danger crackles over the wireless a great white flash goes off. We've suffered a direct hit from the enemy's laser cannon and have been blown to smithereens — at least for a split-second. Just as abruptly, all's back to normal. Except now, hovering over the field of battle is the number '1' in the enemy's score box. We will keep springing back to life like this, to do battle, until one side scores eight hits. That ends the game.

The sound effects, like the radioed distress call, were purely imaginary, as *Laser Tank Duel* runs silently. And though some sound would be nice, I found the game to be quite absorbing without any. Also, the graphics are in stylized form, but well done.

The main screen consists of a grid of avenues, along which the two tanks maneuver through 64 intersections. A varying number of 'mines' float through the avenues, absorbing laser blasts and rendering them harmless; they do no damage to either tank, however.

Laser Tank plays by keyboard control, with the left player controlling vertical moves with the up/down arrows, horizontal moves with the 'Q' and 'W' keys, and cannon fire with the 'Z' key. The right player uses the left and right arrows for horizontal moves, the 'P' and ';' keys for vertical maneuvering, and fires his laser cannon with the '/' key. Good hand and eye coordination are a must for smooth play, but fortunately the difficulty exists in equal degree for

your opponent.

Laser Tank Duel is simple, fun, and comes with clear, straightforward instructions.

(Renaissance Game Designs, P.O.Box 1232, Montclair, NJ 07042, \$15.95 on tape, \$19.95 disk.)

- Courtney Noe



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